AMERICAN GAS JOURNAL

APRIL, 1939

ALWAYS

Constant Pressure

with EMCO REGULATORS

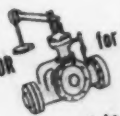
Cp when referring to EMCO Regulators, means CONSTANT PRESSURE. Constant pressure regulation is essential to effect—1) complete and efficient combustion of the gas; 2) the maintenance of predetermined pressures for transmission of the gas efficiently; 3) accurate metering; 4) protection against excessive stresses and strains that might damage or destroy life and property. Consistent engineering research and intimate knowledge of distribution problems of the Gas Industry are responsible for the complete line of EMCO Pressure Regulators. Experienced gas men appreciate the value of satisfactory pressure control. They always specify EMCO Regulators.

There's an EMCO Regulator for Every Type of Service

...NGELATOR" for Controlling Burner Pressure on Gas Ranges. . APPLIANCE REGULATORS

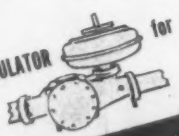
for all Domestic Appliances. . . "EJECTOR" SERVICE REGULATOR

for Domestic and Small Industrial Services. . CRAWFORD REGULATOR for Gas Engines, Industrial Furnaces and Large Appliances. . FIELD REGULATOR



for Reducing High, Large Volume Transmission

...the Field Reduction of High Line Pressures to Intermediate Pressures. . HIGH PRESSURE BALANCED VALVE REGULATOR



for Reducing Large Volume Intermediate Pressures to Efficient Utilization Pressures.

...s to Intermediate Pressures. . LOW PRESSURE BALANCED VALVE REGULATOR

PITTSBURGH EQUITABLE METER COMPANY

MERCO NORDSTROM VALVE CO.

NEW YORK · BUFFALO · PHILADELPHIA · KANSAS CITY · TULSA · LOS ANGELES · DES MOINES · CHICAGO · COLUMBIA · MEMPHIS · OAKLAND · HOUSTON

Main Offices - PITTSBURGH, PA.

HIGH PRESSURES? A recently installed mechanical joint cast iron pipe line delivers gas during peak load at 460 pounds per square inch pressure. A hydrostatic field test at 600 pounds per square inch showed all joints were bottle-tight. Today's cast iron pipe with stuffing-box type mechanical joints, as made by CIPRA members, meets modern operating conditions with the same traditional efficiency which has characterized cast iron pipe throughout the life of the gas industry.

CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1013 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

...ington, S. C. installed this ... iron gas main 102 years ago. ... inspection showed it to be ... good for many more years.

Quickly assembled under any trench conditions, in any weather and with any labor is the bottle-tight mechanical joint.

ONE WORD...

Versatility

Sums Up the Amazing Acceptance of

Semet-Solvay's Reverse Flow Water Gas Machine

1 Equally valuable for both new and conversion installation.

2 Produces uniform gas of required specifications.

3 Either Coke or Bituminous Coal in desired proportions up to 100% of either fuel can be used as generator fuel . . . depending on the economics of the individual situation.

4 Quality of carbureting oil may be selected to suit market conditions, comparable operating efficiencies being maintained.

In less than two years, REVERSE FLOW'S all-round efficiency has won the gas industry's emphatic approval—because of its *exclusive 4-Way VERSATILITY.*

Seven installations in New England and the Middle West *prove* this versatility. Each presents a different problem. Yet in each case a uniform gas of required specifications is being produced more economically, with a minimum of supervision.

REVERSE FLOW represents the first major improvement in gas manufacture in the past decade. We believe it is destined to replace so-called "standard" operation.

Investigate the benefits of Reverse Flow to your plant. See for yourself how easily you can reduce operating and production costs. Write for actual data *today.*

SEMET-SOLVAY

ENGINEERING — **CORPORATION**

SEMET-SOLVAY ENGINEERING CORP. WE SELL SOLUTIONS TO HARD PROBLEMS NEW YORK

Engineers — ***Contractors***

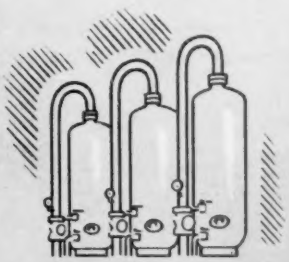
40 RECTOR ST. — **NEW YORK, N. Y.**

AMERICAN GAS JOURNAL, April, 1939. Vol. 150, No. 4. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York, N. Y. Entered as second-class matter, October 7, 1928, at the post-office at East Stroudsburg, Pa., under the Act of March 3, 1879.

NOW GAS IS DOING OUR "Four big jobs" TOO!

CLEAN GAS MAKES SATISFIED CUSTOMERS

That's how customer satisfaction grows ! First she used gas for cooking; then—in order—for refrigeration, automatic water heating and house heating. But if the gas had failed her, do you think she would have extended its use? On the basis of increased consumer satisfaction alone, you are warranted in installing Blaw-Knox Gas Cleaners. In addition to insured continuity of service they give you many values . . . protection of compressors from the erosive effects of scale and sand; increased accuracy in metering; prevention of damage by dirt and rust. Blaw-Knox catalog No. 1581 tells the whole story. Ask for it.



BLAW-KNOX
GAS CLEANERS

BLAW-KNOX DIVISION of Blaw-Knox Company · FARMERS BANK BLDG. · PITTSBURGH, PA

BREAK OUT ALL SALES!

"Man the Sales" contestants are offered three rich ports of call for the sale of Gas Refrigeration

The Port of Old Ice Box Users

The Port of Obsolete Mechanical Refrigerators

The Port of New Homes and Apartments

THE RACE IS ON! Favorable trade winds are whistling through the rigging...eager to fill out your sales! So break out all canvas and head for sales and profits at your three rich ports of call!

Port No. 1 is that still great, unsold market now using ice boxes—or nothing. You and your men can win prospects and make sales by a clear-cut approach proving the need of automatic refrigeration, the basic advantages and savings of gas refrigeration over all others.

Port No. 2 is a market as yet hardly touched by gas refrigeration . . . an estimated million or more homes in which mechanical refrigerators will be replaced this year. Sell them Servel Electrolux *now*—or you may not have another chance for years!

Port No. 3 is the thousands of new homes and apartments now being built with the aid of low first cost and long term payments. All of these new homes should use gas refrigeration along with gas for cooking, water heating and house heating.

The time has come to "man the sales" and take the lead in this great gas refrigeration race for sales and profits in these three rich ports of call . . . and don't forget the additional worthwhile awards waiting to be won by gas companies and salesmen!

Be first in Port

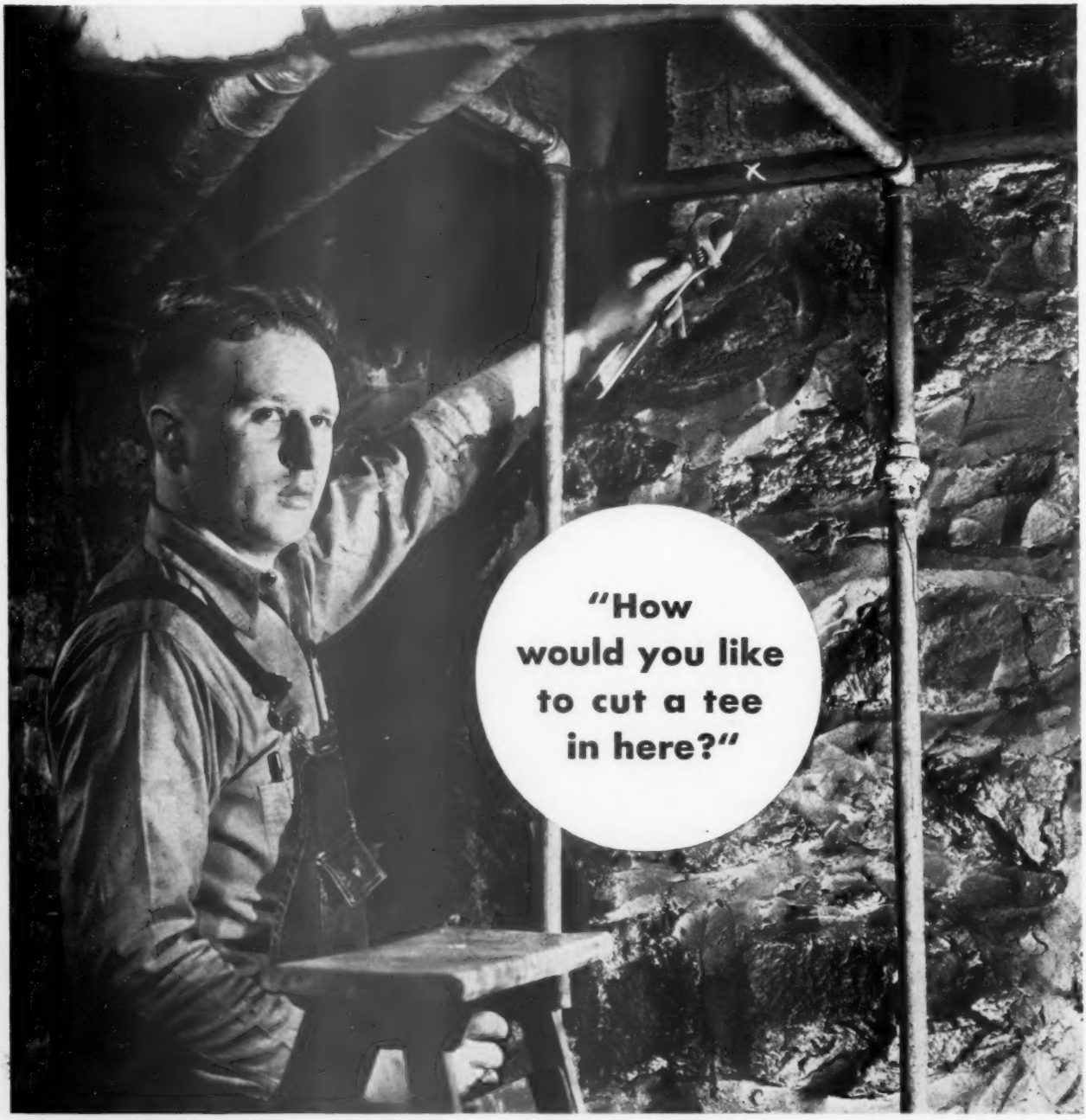
TO WIN THESE GRAND AWARDS

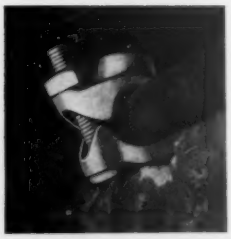
More than 2,000 cash awards for companies and men...39 Flying Cloud clipper ship models for winning gas companies . . . handsome Chelsea ship's bell clocks for winning salesmen.

Sponsored by

THE REFRIGERATION COMMITTEE OF THE A. G. A. AND A. G. A. E. M.

Man the Sales **FOR GAS REFRIGERATION IN 1939**





IT'S EASY WITH SKINNER SADDLE TEE!

● No pipe cutting – no threading. Complete job in 3 minutes! The saving is tremendous. For installing ELECTROLUX – all gas or water appliances. Standard with hundreds of companies. Send for demonstration set-up showing ***Tamper-Proof Bolt.*** No obligation.

M. B. SKINNER CO. *Est. 1898* **SOUTH BEND, IND.**

©C18 412659

AMERICAN GAS JOURNAL

VOLUME 150
NUMBER 4

WHOLE
NUMBER 3784

ESTABLISHED 1859

APRIL, 1939

PUBLISHED MONTHLY BY
AMERICAN GAS JOURNAL, Inc.
53 Park Place, New York

S. G. KRAKE, *President and Treasurer*
M. E. KELLEHER, *Secretary*
A. I. PHILLIPS, *Editorial Director*
H. T. MATTHEW, *Business Manager*
THOMAS MORGAN, *Western Representative*
168 N. Michigan Ave.
Chicago, Ill.

Copyright 1939, American Gas Journal, Inc.

Subscription $2.00 per year U.S.A.; $3.00 Canada; $4.00 Foreign. Single copies, 25 cts.

Contents

Gas Triumphant at New York World's Fair—Hugh H Cuthrell 9

Pacific Coast Gas Industry Boosts Great Exhibit for Dealer and Consumer Interest—E. R. Cline 16

Industrial Gas and the Competitive Angle—Part 2—Raymond F. Mann 19

Experience with Carboseal—F. G. H. Elliot 25

Whose Business Is Who's 27

Building Up a Run Down Gas Plant—Arthur J. Smith 28

"Let Us Look at the Record"—A. M. Beebee 31

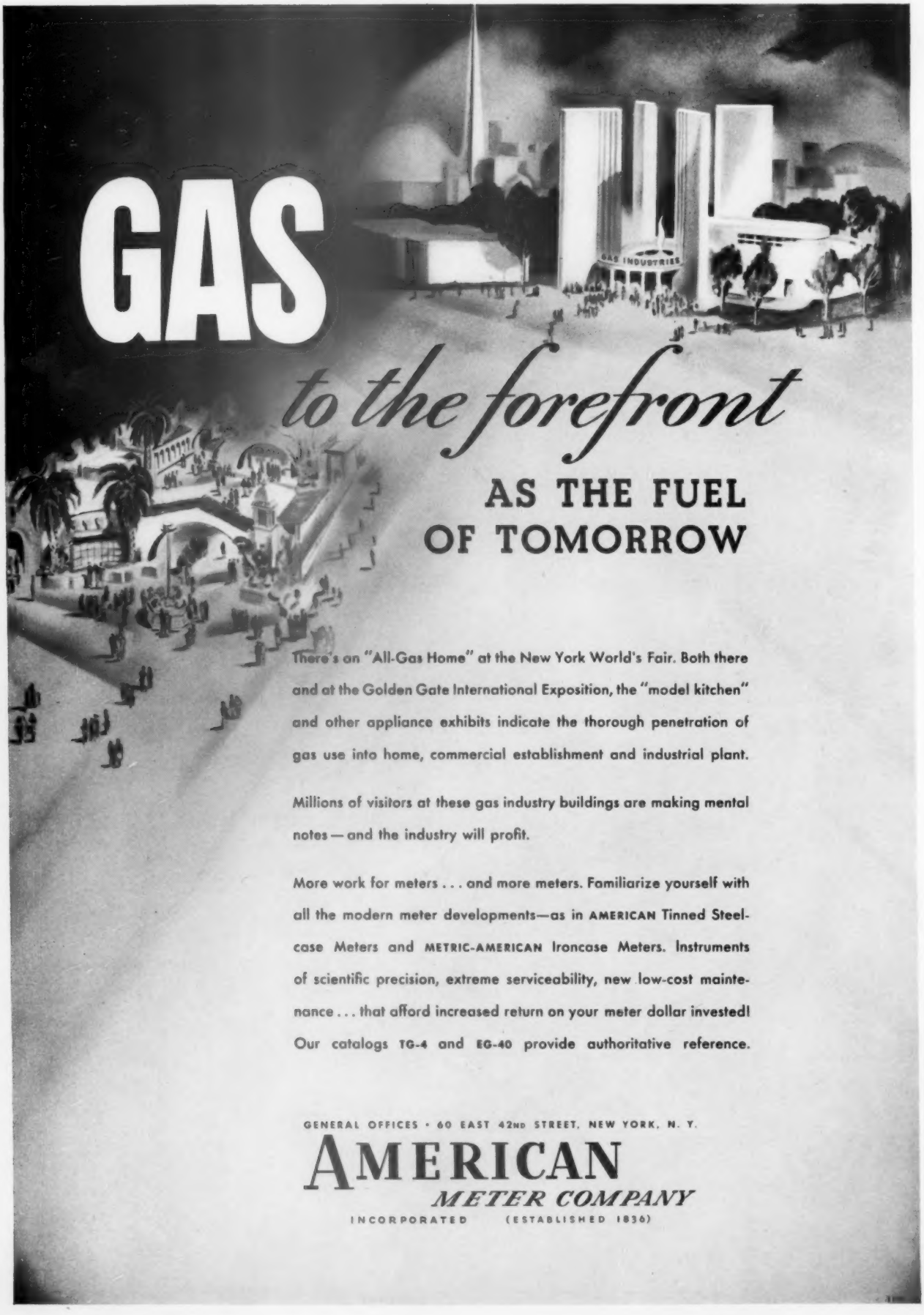
Carbonizing Properties of Sub-bituminous Coal—J. D. Davis & V. F. Parry 38

The Dealer's Position in Gas Range Sales—J. H. Taylor 39

An Analysis of Three Types of House Insulation—J. R. Von Sternberg 40

The Combination Meter and Pressure Regulator — W. P. Hutchinson 42

News of the Industry 45



GAS *to the forefront*

AS THE FUEL OF TOMORROW

There's an "All-Gas Home" at the New York World's Fair. Both there and at the Golden Gate International Exposition, the "model kitchen" and other appliance exhibits indicate the thorough penetration of gas use into home, commercial establishment and industrial plant.

Millions of visitors at these gas industry buildings are making mental notes — and the industry will profit.

More work for meters . . . and more meters. Familiarize yourself with all the modern meter developments—as in AMERICAN Tinned Steelcase Meters and METRIC-AMERICAN Ironcase Meters. Instruments of scientific precision, extreme serviceability, new low-cost maintenance . . . that afford increased return on your meter dollar invested! Our catalogs TG-4 and EG-40 provide authoritative reference.

GENERAL OFFICES • 60 EAST 42ND STREET, NEW YORK, N. Y.

AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

APR 17 1939

APRIL
1939

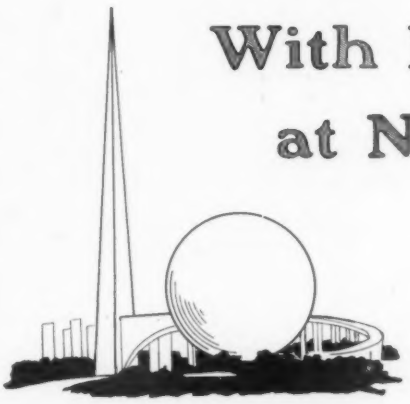
AMERICAN
GAS JOURNAL

VOLUME 150
No. 4

Gas Triumphant!

With Mighty Demonstration at New York World's Fair

The "Court of Flame,"- Gas Industry Exhibits,- The All-American Home,- Spectacular Effects



By
Hugh H. Cuthrell
President – Gas Exhibits, Inc.
Vice President Brooklyn Union Gas Co.

IT CAN BE SAID without exaggeration: the gas industry has outdone itself at the New York World's Fair.

It has materialized out of the blue print stage into the actuality of stone and steel; a gas exhibit that is one of the most spectacular sights to be seen at the Fair.

Millions from all parts of the world will attend. They will see the extensive use of gas throughout the exposition, and will sense that Gas is dominant at the World's Fair, and that it is to be the dominant fuel in "The World of Tomorrow."

That is precisely the effect and achievement for which we have striven over a period of almost two years. The results are astonishing. The success great.

The opportunity which the Fair offers to tell the story of gas is unparalleled. The world-wide audience it brings to the very doors of our industry is unprecedented.

Nearly every nation on the globe, and every state in the Union, is exhibiting. Commerce, industry, science and government, at home and abroad, are citing their contribution to today's world; demonstrating their role in building tomorrow's.

An estimated total of 60,000,000 attendance is expected at the Fair. Gas consumers will be among this vast, receptive audience. The impressions they gain will influence their buying for years to come.

Cooperation Achieves Conquest

From the very first, leaders in the gas industry have been quick to recognize the opportunity of the Fair. They realized also that one or two gas companies alone could not put on an exhibit of sufficient scope to represent the entire industry and to compete with other industries for public attention.

Accordingly, a non-profit corporation, Gas Exhibits, Inc., was formed to create and stage the most outstanding exhibit the industry could devise. The organizing, conducting and financing of this World's Fair exhibit was given over into its hands.

That was in June, 1937. The undertaking involved not only the staging of an exhibit to demonstrate the modernity and flexibility of gas as a fuel in the home and in industry, but also the distribution and selling of gas fuel in volume and for a variety of uses throughout the Fair.

It may be said here that never in the history of the gas industry has there been such whole-hearted cooperation as there has been in putting across this World's Fair project.

Gas has won the distinction of being the principal fuel at the Fair for varied and extensive use.

A gas exhibit has been achieved that will be talked about long after the Fair is over.

Competition Overcome

The victories of the gas industry at the World's Fair have been con-

tested from the start. Other industries in the nation were making similar efforts to derive the greatest benefit from the Fair.

Gas Exhibits, Inc., went into action with "sleeves rolled up." It marshalled the individual gas companies into a cooperative unit; enlisted the best talent inside and outside the industry; in design, architecture, publicity. Less than six months after the breaking of the ground for the Fair site in Flushing Meadow, gas service was installed in the first building erected.

Gas for All Fair Corporation Buildings

Similar conquests followed, climaxing with the most signal victory of all: the signing of a contract between the World's Fair Corporation, and the Brooklyn Union Gas Company and the Consolidated Edison Company of New York on October 26, 1937. This contract designated gas as the exclusive fuel to be used for all space heating and cooking in all of the buildings operated by the Fair Corporation, and in all of the permanent buildings that will remain after the close of the Fair.

But this is not the complete story of gas at the Fair. Here is the impressive line-up:

Gas Exhibits, Inc., was the first private exhibitor to break ground at the Fair site (January 18, 1938.) It marked the "first physical step in the participation of American business and industry in the World's Fair."

Gas is to light streets in the entire Court of States area. Also, spectacular gas flares are to light various sections of the Fair.

Gas for Exhibits and Heating

Outstanding national industries are using gas for exhibits demonstrating the manufacture or processing of their products. This will include a great cooking load from the Fair buildings as well as the concessions.

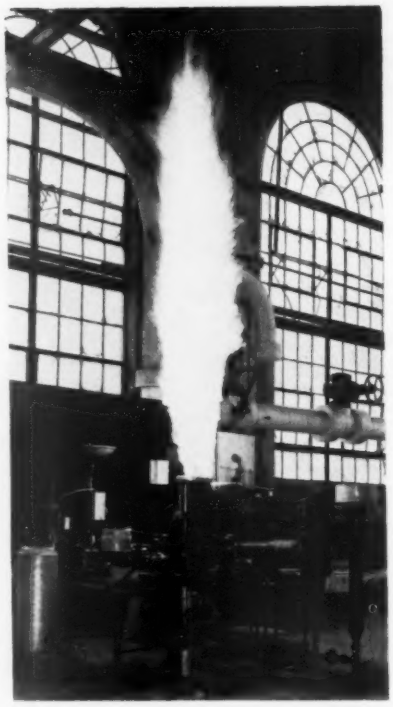
Gas is to be used for spectacular exhibition purposes at the Fair, such as those planned for the Lagoon of Nations and Fountain Lake.

So continuously has the use of gas grown, that 54 buildings were using it for space heating shortly after the first of March. This resulted in the use of approximately 19,000,000 cubic feet during February 1939. This season, the demand for gas at the Fair has been almost four times that of last season. At the beginning of this year, a total of 29 World's Fair Corporation buildings were being heated by gas. These buildings had a maximum hourly demand of 43,500 cu. ft. of gas for space heating.

Ten Miles of Gas Main

In order to supply the gas load for all these varied purposes, it was necessary to lay two miles of 12-inch main outside the Fair Grounds; more than seven miles of mains and over three and one-half miles of service pipe inside the grounds: a service equal to that required for a community the size of Atlantic City, New Jersey.

The distribution system set up takes care of a maximum hourly demand for gas of 900,000 cu. ft. The pre-opening consumption of gas at the New York Fair has been roughly 20,000,000 cu. ft. per month this year.



Testing at The Brooklyn Union Gas Company the flame to be used for spectacular display in the fountains of the "Lagoon of Nations."

These facts and figures speak for themselves—and for Gas Exhibits, Inc.! An outstanding job has been done for the gas industry; one whose benefits will find their way into all its branches.

It was not achieved overnight. The industry's leaders worked steadily,

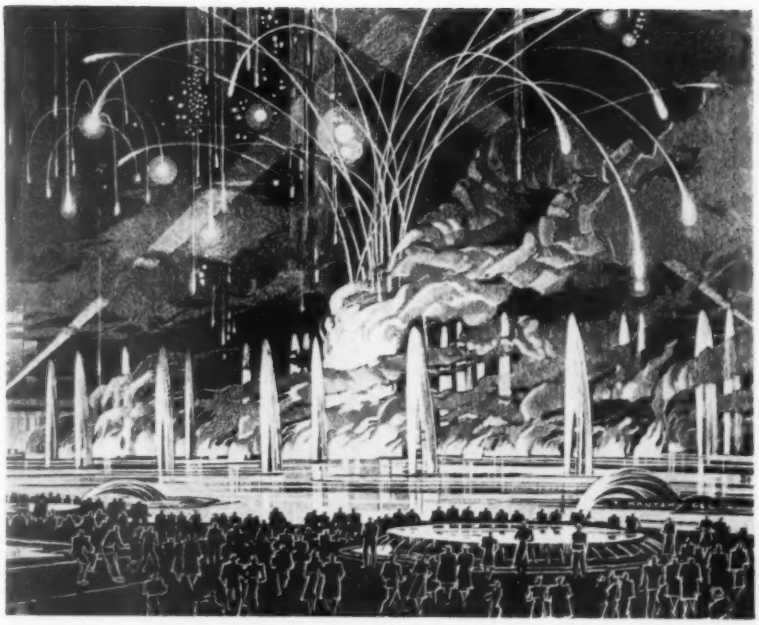
Below is a painting of the "World of Tomorrow" Exposition as it will appear at the opening date on April 30th. In the background is the skyline of Manhattan. In the foreground on the left is the Amusement Area.

persistently, in the face of keen competition. They proved, through test and demonstration, their contention that gas is the modern fuel of today and tomorrow.

With the official stamp of approval given gas fuel by Fair authorities, the statement that "gas will dominate the New York World's Fair of 1939 as it has never dominated any previous American exposition" has been definitely substantiated.

Spectacular Use of Gas

The use of gas at the Fair for illumination and spectacular exhibition purposes will bear special notice. They herald new and startling fields of gas utilization.



Sketch of the inferno of water, fire, color, sound and fireworks to be produced nightly. Water nozzles and gas burners will permit interplay of fountain jets and flames 150 feet high. The spectacle is described as the nearest approach to chaos that man can contrive for purposes of entertainment.

Take the super-spectacle to be staged nightly at the Lagoon of Nations, "The Battle of Creation." In this "inferno of fire, water, color, sound and fireworks" gas will play the role of fire. It is to be the main attraction at the Fair, witnessed by hundreds of thousands. The Lagoon occupies a plot 700 feet by 400 feet, and is situated on the main axis of the World's Fair.

The question arose as to whether gas could successfully represent fire. Again the industry entered the lists against competitors. Again it demonstrated that because of its adaptability and flexibility, gas was the ideal fuel for the spectacle. But that victory brought a new problem.

The scripts for this spectacle called for pilots and gas burners that would not only send flame shooting through the waters of the Lagoon of Nations, but would also withstand the shock of fifty tons of descending water without quenching the fire.

For this an "all-conquering" pilot and burner was perfected and 800,000 to 1,000,000 cubic feet of gas will be used hourly at the World's Fair for this presentation alone. There will be altogether 225 gas burners.

The fireworks display to be given at Fountain Lake provides gas with another opportunity to help achieve "the impossible" in spectacle.

This extravaganza, which also involves fire, water and color, will be given from a dozen or more barges. Fountain Lake is a natural lake in the center of a 280-acre amusement center. In the middle of this lake, surrounded by fountains and flares, one of the biggest gas flares ever created will burn steadily against an onslaught of wind and cascades of water.

To achieve this there was developed a combination burner which uses gas as well as liquid fuels and chemicals. This burner will consume approximately 30,000 cubic feet of gas per hour and 300 gallons of liquid fuel per hour.

For Decorative Illumination

The selection of gas for the World's Fair Business Systems Building is another triumph for the gas industry. Fair officials sought something new and novel to achieve the desired decorative effects for this building. It was felt present methods of advertising illumination did not convey the impression sought for this structure which represents the business world of tomorrow. After considerable study, gas was chosen.

Flames smaller but similar to the single flames in the Lagoon of Nations will be used on the exterior of the building.

The House of Glass

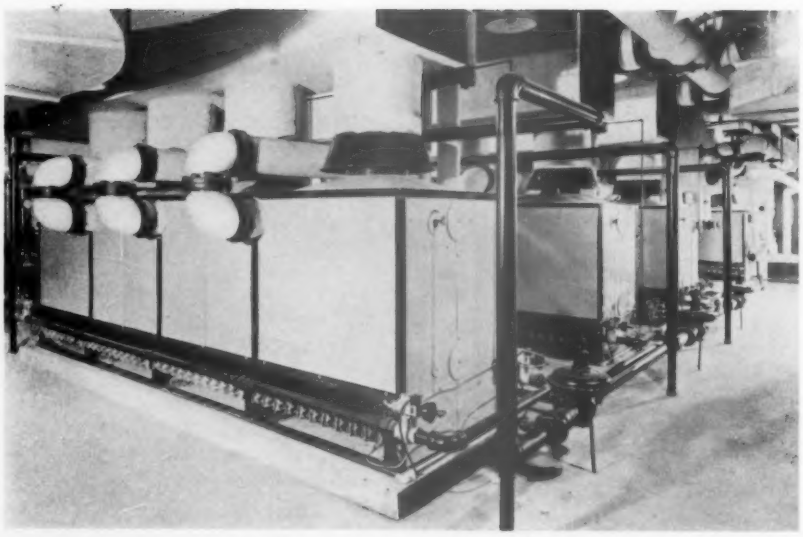
Three large gas-fired boilers supply heat for the exhibit building of the City of New York. Gas also is used in this building for heating water. This building is a permanent installation and will remain as a recreational center after the exposition has ended.

The three boilers have a combined rating of 400 horsepower. A gas designed boiler is also used for heating the water in the building. The ducts used for circulating the hot air for heating during the winter months also are used for furnishing air conditioning in the summer.

New York City's building has been termed a "house of glass" because it has been built practically entirely of glass brick. There is no other building for recreational purposes like it in this country.

The rink or arena floor, in the center of the large hall is 180 feet by 115 feet and is sunk below the floor which is level with the entrance. In winter the arena floor will be used for ice skating and in summer for roller skating, tennis, indoor baseball, and track meets.

The House of Glass faces the Theme Center. Flanked on either



The largest gas heating installation in the United States is in the City of New York Building. Three heating units each with A.G.A. rating of 16,000 feet of steam. In the background a water heating boiler A.G.A. rating 7200 square feet, 51.6 H.P. to heat 3500 gallons of water per hour.

side by a large fountain which is illuminated at night, it has a pool, in the rear, facing Grand Central Parkway.

Set inside open ornamental framework, in groups of 3 to 5 flames, and open to wind and rain, a flickering effect will be obtained, casting highlights and shadows on the decorative figures on the building's walls. Thus the desired effect of life and movement—will be attained. And now we come to the gas industry's own exhibit at the Fair.

From the exhibit building itself, with its spectacular entrance courtyard flanked by pillars of flame, down to the last detail of how gas works and what it can do, effort has been made to encompass the drama, the science and the practical application of gas in the modern home.

The Court of Flame

First to catch the eye are the four towering pylons surrounding the "Court of Flame." Each of the pylons is 90 feet high.

In the center of the "Court," a giant glass cube balanced on one point will catapult a perpetually-burning gas torch high into the air. Air control and addition of certain chemicals to the gas will create constantly changing color ribbons. Approximately 12,000 cu. ft. of gas per hour will be used for the pylons and the center torch.

Surrounding the entire exhibit group, gas "flambeaux" resembling the ceremonial urns of ancient Greece will send forth spirals of wide yellow flame, bringing a magical beauty to the night scene. The incandescent mantle type gas lamps and torches used for this purpose stand 12 feet above the ground. In order to provide a constant source of attraction, the burner groups within the "Court of Flame" will be actuated by timing devices to give variety to individual flames.

Manufacturers and gas companies throughout the country have cooperated in making the gas exhibit one that typifies what gas has done to develop modern civilization and how important it is to the future of mankind.

Grouped about the pylons will be displays and models giving dramatic illustration of the four major services of gas in the home: cooking, water-heating, refrigeration, house-heating.

For the first time in the history of the industry, gas lighting will be recessed in ceiling fixtures, none of which will hang below the level of the ceiling. In the ringlike roof which encircles the "Court of Flame" and is open to the sky, will be recessed four architecturally designed, gas-burning fixtures of 40 in. diameter.

Manufacturers' Displays

In the main exhibition hall adjoining the "Court" manufacturers will display their products. Emphasis here will be placed on answering the why's and how's and wherefore's of everyone with a normal bump of curiosity.

The exhibition hall is a vast one, and the exhibit the most effective one the industry has ever staged. It is a "living" exhibit. Extensive use is being made of moving slides, moving pictures, turntables, push buttons, model kitchens and model basements. Cross-section exhibits will show the inner operation of appliances, and through the medium of contrast, old methods versus new will be demonstrated.

Visitors will see appliances functioning in their natural setting. Kitchen appliances will be set up in model kitchens. Heaters and air-conditioning mechanisms will be in operation in model basements.

Definite color zones have been assigned to definite exhibits. The continuity of design and decoration which will run throughout the entire building will serve further to bring planned order to the exhibit as a whole. It also will serve to emphasize the close association of all the many services offered by the industry rather than any one particular product.

It will be an "action" story that will convey more than words. The consumer will see for himself the merits and miracles of the appliances he uses every day.

Development of Cooking Portrayed

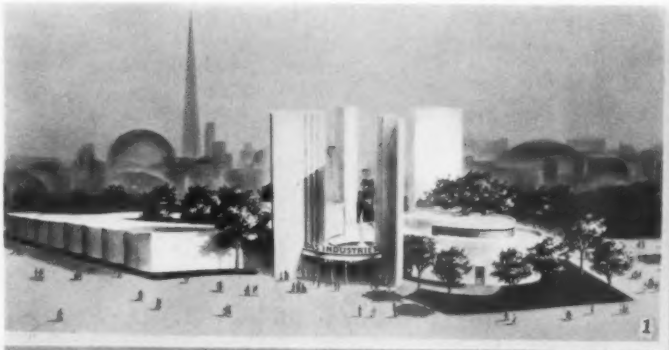
The historical exhibit on cooking, which traces its evolution throughout the rise of civilization, will make women thankful they live in a day of modern kitchen appliances. As they view the developments which have transformed the undisciplined fire of early days into the faithful servant of today, ready for action at a split-second's notice, they will gain new respect for their modern gas range; a new appreciation of the time, effort and genius that have gone into making their household tasks easier and more effortless.

This particular exhibit strikingly symbolizes the rise of man from primitive life to the ease and freedom of today, and the future. For civilization progresses with its control of cooking fuel. In the old days, apparently, cooking was something of a battle with the flames. Coercion, coddling, encouragement of fire, were once part and parcel of preparing a meal. Recalcitrant fire, undisciplined and determined, is a far cry from the obedient heat which spurts on and off nowadays at the turn of the hand.

Water Heating —Refrigeration

The miracle of automatic gas water heating will also be depicted in colorful manner at the exhibition hall.

Some Outstanding Points of Interest to World's Fair Visitors



1—General View of the "Court of Flame" around which the gas exhibits are displayed.

2—The seventy-foot entrance facade of the Hall of Communications which will house exhibits relating to means of communication. The mural by Eugene Savage is dedicated to modern and ancient means of communication. The structure will contain a restaurant seating 500. Standing sentinel before it are two 160-foot pylons slotted with shafts of light.

3—The Administration Building is air-conditioned, scientifically designed and modern in every respect. The central figure of the sculpture adorning the building facade rises above the towers of Manhattan. She lifts with her the veil that has obscured the "World of Tomorrow."

4—A recent photograph of the Gas Industries Court of Flame. During the summer the full effect of the well conceived landscaping will be realized.

5—Newly perfected large puppets without strings will perform a repertory of grand opera at the Fair. Synchronized to recordings of world's great artists, 160 of these thirteen-inch puppets will sing, dance, fight, love, and die several times daily at the gas industry's exhibit. Shown here is a scene in "Aida" with a background of elaborate scenery.

6—Model of the Federal area where the United States Government will be host to millions of visitors. Above, the imposing Federal Building, and on each side of the Court of Peace in which 50,000 persons can assemble, will be eight structures comprising the Hall of Nations. Some 65 foreign countries will be represented, apart from their individual buildings.

A sense of coolness like that which one may imagine existed in the ice caves before the dawn of history will greet the visitor as soon as he enters the "Magic Caves of Ice." Furnished by the air-conditioning department of Servel, Inc. this feature will be particularly welcome during the hot summer months of the Fair.

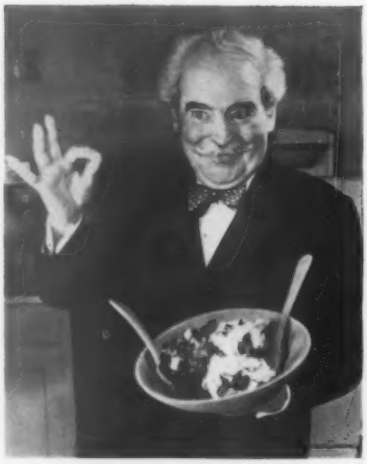
An unusual exhibit will be the one known as "The Magic Caves of Ice." This will trace the age-long history of refrigeration from the days of the cave-man, who preserved his "kill" in cool, rocky crevices, to the present day competence of automatic gas refrigeration. Settings will be elaborate, simulating the various periods and surroundings in which refrigeration progressed.

An important feature of this exhibit of Servel, Inc., will consist of ten dioramas citing the beginning of domestic refrigeration in pre-historic times, and how it was developed from a primitive stage to its present perfected state.

Another of the exhibits being prepared for the exhibition hall contrasts the old fashioned methods of home heating with the recent advances made in the science of heating and air-conditioning. Here again, progress toward the kind of comfort which leaves people free to develop life on a scale above that of merely keeping warm and fed will be portrayed.

Daily Cooking Lectures

The official host for the gas industry's exhibit will be George Rector, world-renowned restaurateur and authority on food. Known to millions through his syndicated newspaper column, his magazine articles and radio appearances, he will gain new listeners and win new friends for the gas industry at the lectures and demonstrations he is to give daily in the modern theatre of the exhibit group. These will have to do with the preparation and serving of food.



GEORGE RECTOR

Emphasis will at all times be placed on cooking the modern way, with gas.

The souvenir cook-book, "Home At The Range with George Rector" which he has prepared exclusively for the gas industry, will be autographed by him for visitors to the Fair. The book contains a collection of his own recipes for which he is famed. All are practical, some are Continental and more colorful than the usual run of recipes.

The All-Gas Home

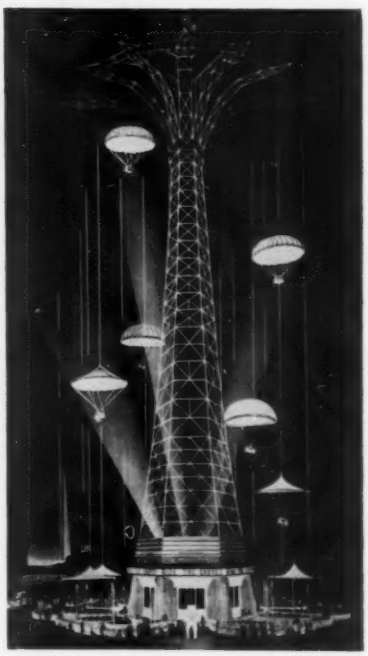
An All-Gas home, to show visitors to the New York World's Fair how the typical American family may live "tomorrow," will be another unique feature of the gas industry's participation in the Fair. It is being done in cooperation with Good Housekeeping Magazine which will furnish and decorate it, and will be known as "Homewood,"—the All-Gas, Good Housekeeping Home.

It will be modern, but not modernistic, and planned to meet the demands of the majority of Americans. The house has been developed as a demonstration of the convenience and comfort that can be obtained when house heating, air-conditioning, water heating, refrigeration, cooking and laundry equipment are all powered by gas.

Designed with the moderate income group in mind, the home will be of white stucco, with roof, shutters and doorway in color. Its pillared portico will be the type already familiar to Americans everywhere as the doorway to the White House and the homes of Washington and Jefferson.

The architectural inspiration for the house comes from a famous and thoroughly American prototype—an historic house outside of Baltimore, Maryland, called "Homewood."

This famous post-revolutionary house was built by Charles Carroll, signer of the Declaration of Independence, for his son John, and embodies many architectural elements which Americans appreciate.



This 250-foot steel structure with parachutes in operation is one of the concessions in the Amusement Area. Eleven of the 'chutes, each seating two passengers, will be hoisted by steel cables to the top of the tower and then released to give the passengers the experience of "bailing out" from a winging plane.

Its overall lines and dignified beauty have been retained in the modernized version. The modification of plan and exterior to meet present and future living conditions was done along lines determined by research into the preference of feminine America. It is a combination of modern classical and Regency in design.

Although it will be but one story high, it will differ from the ordinary bungalow in size and type of construction. Planned for a large suburban lot, it will have a width of 80 feet and a depth varying from 20 to 26 feet. The entire structure will contain ten rooms and three baths, all with extra-sized windows to conform to the modern demand for light and air.

It is to face directly on the Fair street to be known as "Fireside Row," and will stand in the landscaped patio of the gas industry's "Court of Flame" exhibit.

In the main section of the house will be the reception hall, living room, dining room, study, two bedrooms and two baths. The left wing provides for the kitchen, laundry and pantry.

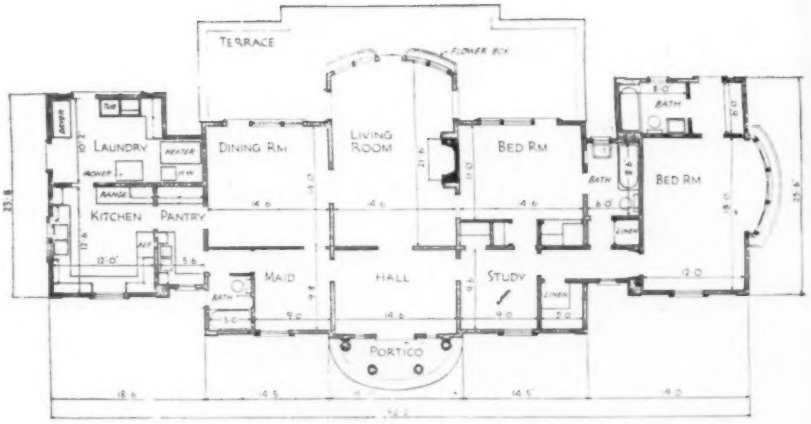
In the matching wing on the other side will be a master bedroom, bath and dressing room. The living room, which will be 16 by 24 feet, will have a curved bay of French windows opening onto a terrace at the rear. The tendency of the modern American family, experts say, is to live more and more at the back of the house away from the street. Hence the terrace arrangement where living can be done in the open as much of the year as possible. Relieving the front facade will be a columned portico flanked by French windows. Mr. Baum estimates it would cost approximately $12,000 to erect this house in the New York suburban area.

The kitchen, pantry and utility room have been designed to embody all the best techniques in home management.

An all-purpose room adjoining the kitchen will house the modern gas heating, air-conditioning and laundry equipment. The kitchen itself, together with a pantry, will provide plenty of working space while including all the step-and-space-saving devices the moderns have learned so well. The newest types of gas range and gas refrigerator will take care of food problems.

The heating plant will be a prominent feature of the home. It is to occupy a space five feet square and seven feet high in the laundry, unless a cellar is preferred.

(Concluded on page 44)



The "All-American" home embodies the traditions of yesterday while aiming at "tomorrow's" living. Part of the gas industry's exhibit.

EXHIBITORS IN GAS INDUSTRIES BUILDING

American Gas Products Div.
American Stove Company
Bryant Heater Company
Cleveland Heater Company
Cribben & Sexton Company
Detroit-Michigan Stove Co.
Estate Stove Company
General Gas Light Company
Glenwood Range Company
Handley Brown Heater Company
Hardwick Stove Company
L. J. Mueller Furnace Company
Roberts & Mander Stove Company
Robertshaw Thermostat Company
George D. Roper Corp.
Ruud Manufacturing Company
Servel, Inc.
Surface Combustion Corp.
Tappan Stove Company
Welsbach Company

APPLIANCE & ACCESSORY MANUFACTURERS

Subscribers to Gas Exhibits Inc.

Alpha-Lux, Inc., The
American Cast Iron Pipe Co.
American Meter Co.
W. M. Chace Company
Clark Bros., Inc.
Consolidated Brass Co.
Cooper-Bessemer Corporation
Crane Company
Detroit Brass & Malleable Wks
Detroit Lubricator Co.
Dresser Manufacturing Co.
Florence Pipe & Foundry Co.
Gas Purifying Materials Co.
B. F. Gilmour Co.
Glamorgan Pipe & Foundry Co.
Harper Wyman Mfg. Co.
Lambert Meter Co.
Lattimer-Stevens Co.
Lincoln Brass Works, Inc.
Ludlow Valve Mfg. Co.
McWane Cast Iron Pipe Co.
Milwaukee Gas Specialty Co.
Mueller Company
Partlow Corporation
Pittsburgh Equitable Meter Co.
Pittsburg Water Heater Co.
Research Corporation
Reynolds Gas Regulator Co.
Roberts Brass Co.
Roots-Connersville Blower Corp.
W. J. Schoenberger Co.
Security Stove & Mfg. Co.
M. B. Skinner Co.
The Sprague Meter Co.
Superior Meter Co.
United Eng'rs & Construction, Inc.
United States Pipe & Foundry Co.
Wallaceburg Brass Ltd.
Warren Foundry and Pipe Corp.
John Wood Manufacturing Co.
R. D. Wood Company
Worthington Pump & Machinery Corp.

Pacific Coast Gas Industry Boosts Great Exhibit for Dealer and Consumer Interest

By
E. R. Cline
Alameda, California

DOORS of gas ranges and gas refrigerators open and close mysteriously as if unseen hands would disclose the mysteries of new devices for the convenience of the home. Appliances turn on revolving platforms. Small models on continuous belts move into vision, silently drop out of sight and reappear on the opposite side. An actual stage that might have been taken from a small theatre drops the curtain on one automatic scene; raises it on a new one. Demonstration of the appliances goes on with no apparent human assistance. A giant 3,000 candle power street lamp with a circle of gas jets sheds its illumination over part of the great floor where there is a complete modern home and a planning kitchen, both completely gas equipped. There are scores of novel displays that might have been taken from some individual dealer's window.

All these and many other features of Pacific Coast Gas Association Gas Industries Exhibit are the answer of Exhibit Manager L. E. Lindsay of the Seattle Gas Co., when asked to produce a display at the Golden Gate International Exposition on Treasure Island in San Francisco Bay. A sum of close to $150,000.00 was supplied by more than 40 cooperating utilities and appliance manufacturers.

Of 15,000 Btu. capacity, the great air conditioning unit, that winter conditions the exhibits, floods the 12,000 square feet of display with an ample volume of filtered, humidified air of just the proper temperature to make the thousands of daily visitors comfortable. It makes them stay at the gas exhibits and develops new and greater interest in gas.

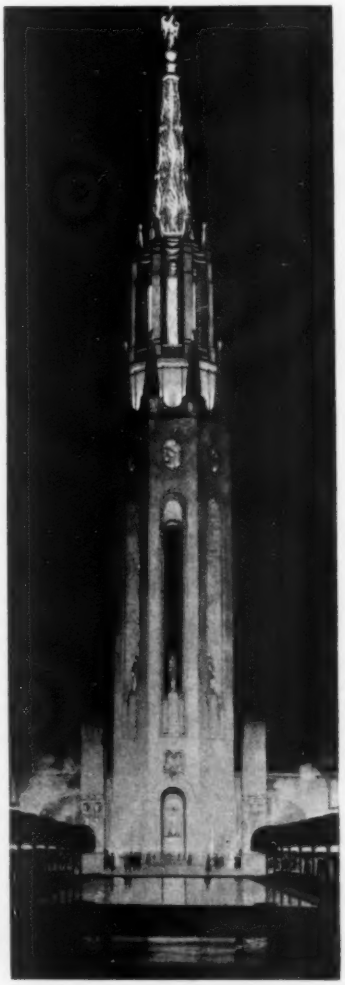
In addition to building greater customer interest, the interest of dealers, appliance salesmen, utility people, and mechanics of every type is also increased.

Designed and built by L. E. Lindsay, the Pacific Coast Gas Association Gas Industries Exhibit is managed by A. L. Walker. Both of these men are on leave from their respective companies for a year. What they will have accomplished when the Exposition closes in December remains to be seen, but already they have exerted a wide influence in the industry. No actual count of visitors has been made; but according to Mr. Walker, at least 20,000 people saw the gas exhibits during the first two weeks of the Fair. The names of about 250 people who want information on some form of gas application have been listed daily. A huge wall graph of interested visitors is kept, and this shows a sharply increasing daily number of inquirers. "These visitors who spontaneously state that they are interested in some new phase of gas application in their homes or places of business are positively sincere," declared Mr. Walker, "especially when they freely give their home address and evidence a desire that we notify their local appliance dealer of the fact."

A huge 26-foot turntable back of the scene is equipped with seven 14-foot platforms. Each platform is completely equipped with motors, cams and rollers and devices for opening every door of a given gas range, and for demonstrating every moving part. A complete set of operating equipment is also provided for a gas refrigeration unit and for other devices. The stage on which these exhibits are shown is an elaborate theatre affair, exact in all proportions though smaller. Automatically the curtain goes up and down, and automatically a new display of a range is brought into view. The motion of all operating equipment but the "stage" being demonstrated is automatically cut off. Each platform is exposed to view for about five minutes, or any given one may be held as long as desired in full view and be kept demonstrating.

This exhibit proves the value to the local dealer of action type displays. While no individual dealer probably could spare the space and invest the money for such an elaborate display, it has demonstrated fully the advantage of even a single unit equipped for some form of motion. There is intrigue and interest in seeming automatic movements, like doors opening and closing as if actuated by a spirit hand; and shoppers and even pedestrians upon the street are bound to be interested and stopped. Some type of action, more spectacular display and more general interest in creating eye-attention is necessary to promote more appliance volume.

The winter air conditioning idea of the display is unique, quite evident and self demonstrating, even in view of the open top of the exhibit structure under the dome of the huge exposition building in which it is located. It cost $15,000.00 to install this big 15,000 Btu. unit—but it is "paying its way." "Nice and comfortable in here, and that fresh air



Exposition Central Theme—
TOWER OF THE SUN

Some of the Animated Kitchen Exhibits at Golden Gate Exposition

TOP:—Left, Magic Chef Range CP Model, Garden Scene at Windsor. Right, Porta-Bilt Kitchen in Kitchen Planning Bungalow with Roper CP Range and Electrolux Refrigerator.

CENTER:—Left, "Universal" CP Range and Electrolux, steak and tomatoes in broiler. Right, Roper CP Range and Electrolux. Shows top stove food.

BOTTOM:—Left, Gaffers & Sattler CP Range, oven dinner, rolled roast. Right, Wedgewood CP Range, Electrolux and Lowboy water heater.

A group of strolling Mexican Troubadours lends color and action to the gas exhibits. On the left they are at the entrance to the gas exhibit and at the right they are giving a performance before a Roper and Electrolux exhibit. This kitchen has deep cream walls, deep blue interior of cabinets with glass shelves, marbleized white with blue linoleum, blue knobs on cabinets and pastel pottery.

is great!" That is the comment frequently heard. Save for a provision for cooling, the exhibit is completely "air conditioned," by gas. The type of structures housing it and the general temperature condition does not generally call for cooling; nor is heating often required except mornings and evenings, yet purified humidified air is always circulated when the exhibit is open.

Of unusual interest to all visitors is the complete small home, gas equipped, and the model completely equipped gas kitchen, where actual working information by trained experts is available on any feature of its operation. Women visitors are especially interested in the latter and they spend much time in it, or in the comfortable chairs or lounges of the "home."

Dealers are especially concerned about displays for they are most interesting. They see that motion and demonstrations of some kind, even those where trained economists perform operations, excite and hold interest and cause questions to be asked. They view many different kinds of displays that can affect them in their own stores. They get new ideas for promotions. They see the necessity for the intelligent use of manufacturers sales helps.

Exactly 47 producing concerns in the industry have supplied this exhibit for creating greater dealer interest and for building greater consumer interest. Fifteen trained people work in relays to guide, instruct and entertain dealers and visitors. Every modern thing is shown—even advance models, for manufacturers worked overtime to perfect appliances for the exhibit. "It is one of the most advanced dramatizations of gas and appliances that we and our associates could devise," declared Mr. Walker. "Some of it is truly dramatization as that word is more generally accepted; but, after all it is showing the actual application, and proving it, that elicits and holds the intense interest we are experiencing from unexpected crowds."

There is the usual complement of greatly enlarged photographs of homes, showing gas in many applications. There are cozy restful corners and nooks, rooms and departments, all connected in one great space where the influence of gas pervades the atmosphere.

Dealers from any city or country, if and when they visit the Fair, are cordially invited to call and see the exhibit, interchange ideas, get new ones, investigate all of the applications and devices, and carry away with them a greater inspiration to extend the usefulness of gas in both commercial and domestic uses in their own communities. There is something of unusual interest for them, some ideas that will help them to make more money.

Join the CP Ranger Club

The National Society of Leading Gas Range Salesmen

Membership in the CP Ranger Club is open to everyone promoting the sale of CP gas ranges. Utility salesmen, supervisors and sales managers may participate providing their local gas company has registered. Dealers and their salesmen may register and participate at no extra cost. Membership is for one year only and members must qualify each year.

Rangers must personally sell 40 CP ranges during the calendar year. Supervisors, managers, and dealers become CP Rangers when 75% of the salesmen under their jurisdiction become CP Rangers.

Star Rangers are outstanding salesmen who sell 80 CP ranges in a calendar year. Managers, supervisors and dealers become Star Rangers when 100% of the salesmen they supervise become CP Rangers in a calendar year.

The CP Ranger Club is a challenge to you to match your sales ability against top-notch gas range salesmen not only in your region, but from coast to coast. Accept that challenge! Make your plans now to earn the Badge and Certificate of Certified Performance Salesmanship—the symbols that mean new honors, new awards, greater self-confidence, wider personal prestige, and increased earnings—the national sales credentials that will identify you from one end of the country to the other as an aggressive salesman and a successful sales builder.

Anyone selling CP gas ranges is eligible to win these honors. Look over the awards you win when you become a CP Ranger! Read the simple membership requirements. Make sure your organization registers.

For membership application blank address American Gas Association, 420 Lexington Avenue, New York.

Industrial Gas and the Competitive Angle

Part 2

by

Raymond F. Mann

Wentz-Mann Company
Kenmore, N. Y.

THE greatest competitor of gas for the industrial fuel market, as for the househeating market, is unquestionably fuel oil. Usually selling at a lower invoice cost per million Btu's and possessing many of the desirable features of gas in comparison with the solid fuel, it is a tough competitor at the best. It is only by possessing a thorough understanding of all its good and bad points that we can hope to compete successfully with such a potent rival.

In the last article we found that the disadvantages of coal and coke spring from, and are inseparably linked with their physical state, that of a solid. Among these disadvantages are their dependence on man power, the difficulty with which they are converted into useful heat and their lack of response to control. Turning now to the fuel oils, we find once again that the physical state, this time that of a liquid, has introduced certain rather powerful disadvantages. Speaking broadly, it is only gases that burn; and the process required in the case of solids and liquids to convert them into the gaseous state means the introduction of considerable complication and loss.

Convenience in Handling

It is true, to be sure, that this process is somewhat simpler with the liquid fuels than with the solid fuels; and the resulting disadvantages are less apparent. Thus, in the first place, in the handling of fuel oil the human element is far less important. Delivery is made by tank car or wagon; and gravity is utilized to carry the oil into the storage system, usually underground. From here the oil is pumped out as needed and is fed through a pipe line to the various furnaces throughout the plant, with the turn of a valve controlling the flow. Labor has been nearly eliminated, although, as we shall see, since we have introduced pumps and motors, we have created the need for maintenance and service and hence a certain demand for skilled labor.

Heat Conversion Convenient

In the second place, the conversion into useful heat presented considerable of a problem with the solid fuels. Large combustion chambers, space for the storage of fuel within the furnace itself, means for the removal of a sizable residue were all essential. Oil, on the other hand, flows into the furnace as needed, its flow being controlled by an orifice or valve. There is no residue to remove. The combustion space may be somewhat smaller. Flue passages do not have to be so large nor so free from baffling. Heat transfer does not have to be so largely by radiation. Indirect heating surface comes into play. The air for combustion is led in under pressure and mixed with the oil as it leaves the burner nozzle (or within the burner). Chimney draft plays a far less important part. All these are factors reducing the bulk and hence increasing the efficiency of the furnace.

Large Combustion Chamber

Compared to gas, however, the combustion space is large and the flame long. This is because the oil has to be vaporized or atomized before it can be used. Quoting the A.S.H.V.E. Guide: "The purpose of atomization is greatly to increase the surface area of a given quantity of oil in order to accelerate the change from the liquid state (in which oil cannot burn) to the gaseous or vaporous state, in which state it is one of the elementary fuels, gaseous hydrocarbon. This conversion is largely accomplished through the action of radiant heat energy upon the flying globules of oil, and the tremendously increased surface provided aids gasification." Thus there is no oil burner comparable with the drilled pipe gas burner, that handy tool of the industrial gas engineer, nor the many other atmospheric gas burners that give such valiant service for temperatures below 900°F. A series of small oil flames is unknown. Gas can be burned in quantities as low as 200 Btu's an hour to each flame. There is no way of dealing with such small quantities of oil. Nor can oil be burned within a metal tube, as is gas in the radiant tube burner or the ordinary immersion burner. Using the phenomenon of surface combustion (the ability of granular, porous solid when incandescent to speed up the reaction between gas and air to such an extent that the resulting combustion is flameless or on the "surface") large quantities of gas can be burned in small tunnels or on the face of small refractory beds practically without flame; and only the hot products of combustion and the radiant heat of the miniature combustion chambers enters the furnace proper. The heat energy is thus released in the walls of the furnace itself, and all unburned fuel is consumed within a few inches of the burner nozzle. Oil calls for different measures. At the other extreme, when a long flame is desirable the diffusion gas burner can give a flame many feet in length. Thus with gas there is a "flexibility" (an often misused word by the way) that is not obtainable with fuel oil.

In speaking of flame characteristics, mention should be made of the fact that the oil flame is far more destructive in its action than the gas flame. Fire brick refractories or metal surfaces fail far sooner with oil. There seems to be both greater abrasive action and greater chemical action. This statement is proven in the forging industry where gas fired forges go many times as long as oil fired forges before relining. In a local instance, on oil the lining had to be overhauled every three weeks, on gas it ran six months before it needed similar attention. This point is reflected in the care that has to be taken in the design of oil-fired equipment to protect all parts from direct flame impingement, and shows up in the size, cost and lower operat-

ing efficiency of such equipment as compared to similar gas-fired equipment. (Note the case of a tin pot described in the January 1939 issue where 1 Btu of gas replaced 3.99 Btu of oil largely because of the massive combustion chamber built to protect the tin pot from direct oil flame impingement).

The length of the oil flame and its destructive effects militate against such furnace design as that which is typical for gas-fired galvanizing kettles. The gas kettle is heated by a series of small burners along each side, firing down into refractory beds placed in a narrow space between the outer wall and the kettle itself, separated from the latter only by a tile that does not extend up the entire exposed side. Thus the total energy of the gas is released within a small area, giving the highest possible temperature concentration; and as the heat is immediately transmitted to the kettle, it has the maximum temperature gradient behind it, leading to the full utilization of the heat and to high efficiencies. Oil, on the other hand, is usually burned in two long flames, one each side of the kettle, firing down long flues entirely brick-lined and hence separated from the kettle by several inches of brick, retarding the flow of heat, causing higher stack temperatures and thus lowering efficiencies.

It is this very difference in the flame characteristics of the two fuels that is accountable for many of lower oil efficiencies in the table given later on. The flexible gas flame lends itself readily to the most efficient furnace design, while frequently oil fired furnaces must be built around the shortcomings of that fuel and the nature of its combustion.

Control Inferior to Gas

The third disadvantage of the solid fuels was found to be the difficulty in controlling their combustion, both as regards temperature and as regards furnace atmosphere. Fuel oil again is superior to coal and coke, but once again inferior to gas. In previous issues we have described the various systems of burning gas, emphasizing in particular the automatically proportioning types, the one-valve kind where the gas-air ratio remains fixed over the turn down range and only one valve must be adjusted for various rates of flow. Obviously, such systems permit the maintenance of high efficiencies with varying furnace demands. It is not possible to say that proportioning equipment is not available for fuel oil, since there are systems of interlocking double valves that accomplish such an aim; but, to the writer's knowledge at least, there is no common, everyday method of burning oil where the kinetic energy of either the oil or the air is used to bring about this proportioning and where a wide range of turndown is available.

Gas Mixes Readily

City gas and air are both similar states of matter (gases) and obey similar natural laws. They diffuse one in the other and mix readily. Gas at a few pounds pressure will draw in from the atmosphere the correct amount of air for its combustion, and with the venturi design, will maintain this same ratio over a considerable turndown. Again, air at one pound pressure furnishes enough energy to draw in the correct amount of gas from a regulator set at zero pressure, and likewise will maintain the ratio over a wide range of demand. Oil and air are, however, two different breeds of cats. Repeating ourselves once more, only after the oil has been gasified can it react with the combustion air. The elementary method of burning oil is to pump the oil to a high pressure, generally 30 to 40 pounds per square inch, and to force it at this pressure through a small orifice into a stream of air. The air carries the minute droplets out into the furnace, where the heat present gasifies the drops, and combustion with the surrounding air follows. As a modification of this method, high pressure air or steam is used to break up the oil and carry it through the nozzle. But in either case we are dealing with two differing elements that have no natural desire to mix, whose mixture is an unstable one and must be terminated as quickly as possible. As a consequence we have far less control over the oil-air mixture than the gas-air mixture. Turndown is limited; ignition presents difficulties; burner design is sharply circumscribed, as we noted above, and atmospheric control is often inadequate.

Let us consider this last item, atmospheric control. We know, of course, that maximum efficiency is attained only with neutral mixtures, that is, when fuel and air are present in just the proper proportions. We also realize that certain heating processes demand special atmospheres. Thus heat treating is usually carried out in a slightly reducing or "rich" atmosphere to prevent scaling of the steel as far as possible. Ceramic work on the other hand demands an oxidizing or "lean" atmosphere. So does core baking. With gas firing, any atmosphere, reducing, oxidizing, or neutral, can be easily maintained with no other difficulty than the sacrifice of a small degree of efficiency. Oil, however, for its complete combustion demands an excess of air. The theoretical quantity of air averages about 1,500 cubic feet per gallon; but the usually accepted figure is 1,800 cubic feet per gallon, or a 20% excess air. Since this corresponds to about a 13% CO_2 flue gas analysis, we realize that far greater quantities of excess air are the rule rather than the exception. Attempts to run a reducing flame generally result in a smoky flame and the deposition of a heavy layer of soot within the furnace or its flue passages. This same smoke is apt to accompany the starting up of a cold furnace. It is only when the refractories are hot enough to assist in the volatilization of the oil that a clear flame results. It is therefore much easier to demand an oxidizing atmosphere of an oil burner than a reducing one. If the control is of the conventional two valve type, and setting of the flame is controlled by the operator's eye, it is almost hopeless to expect maximum efficiency, certainly nothing comparable with what we expect and receive from modern, well designed gas furnaces.

So far we have spoken of "fuel oil" as if the term stood for a material of definite, fixed characteristics such as coke, natural gas, etc. This is far from the case, as the petroleum oils used for fuel vary widely in their physical characteristics, running from one that is a water-clear liquid to one that is virtually a solid at ordinary temperatures and must be heated before it can be pumped through a pipe line or sprayed through a burner nozzle. The oil industry divides the liquid fuels into six classifications as given in the following table I:

Number 1 oil is a first cousin of kerosene and the most expensive. Number 2 is the type generally called "furnace oil" and the most common for domestic oil burners, although many such burners are capable of burning a heavier grade. Number 3 is the usual industrial furnace oil. The new cracking stills yield number 3 and number 6 and as a result of the price, the use of these grades is increasing at the expense of number 4 and 5. Number 4 is another industrial type, but quite generally today displaced by number 3. Number 5, also known as "Bunker B", is a very heavy oil. If stored underground out-of-doors it requires preheating before it can properly be

Table I

Commercial Standard Fuel Oil Specifications

Grade of Oil	Flash Point Min.	Flash Point Max.	App. Grav. A.P.I. 60° F.	Lb. per Gal. 60° F.	App. Heat Content B.t.u./gal.
No. 1					
Light domestic fuel oil-distillate	110° F.	165°	38° to 40°	6.89 to 6.97	136,000
No. 2					
Medium domestic fuel oil-distillate.	125°	190°	34° to 36°	7.05 to 7.14	138,500
No. 3					
Heavy domestic fuel oil-distillate.	150°	200°	28° to 32°	7.23 to 7.41	141,000
No. 4					
Light industrial fuel oil "Bunker A"..	150°	Not less than 250°	24° to 26°	7.51 to 7.60	145,000
No. 5					
Medium industrial fuel oil "Bunker B"	150°	....	18° to 22°	7.70 to 7.90	148,500
No. 6					
Heavy industrial fuel oil "Bunker C"	150°	....	14° to 16°	8.01 to 8.12	152,000

handled and pumped to the burner. With indoor storage (hardly usual procedure) it may sometimes be used without heating. Number 6, or "Bunker C", is the heaviest, contains the most heat units per gallon, and sells at the lowest price. Its normal consistency at room temperature resembles liver, and it must be heated to anywhere from 140°F to 300°F depending on the type of burner. The higher the temperature the more fluid it is, the shorter the flame, and the better all around operating efficiency.

Reasons for Using Light Oils

It will be noted that heat content increases and price decreases going from the light oils through the Bunker oils. Then why are not the heavier oils used exclusively? A saving of at least a cent a gallon, or not less than 20%, would seem worth while. The answer lies in the added costs and operating complications introduced with the heavy oils. The initial cost for burner and heating equipment is much greater. Maintenance is greatly increased. Interruptions are more frequent. Quoting from an address by an oil engineer, abstracted in the December 1936 issue of Heating, Piping and Air Conditioning Magazine: — "Bunker fuel oil is the residuum of a complete refining process, and naturally it is very much heavier than the original crude. Since it has been subjected to high pressures and temperatures in the fining process, the carbon content is in some measure affected-solidified or coked. When heat is again applied, this carbon content is felt in the clogging of strainers, heaters, burners, and control mechanism. Its most important characteristic is its viscosity. Where viscosity uniformly decreases with temperature rise, little difficulty is encountered. When it diminishes rapidly, with only a small temperature change, difficulty is encountered in designing proper compensating devices to insure constant oil flow to the burners." The same author also says "the use of No. 6 or Bunker C is not the answer to economy in all cases. Automatic equipment burning heavy oil is not a cure-all." For the small plant #6 oil is definitely uneconomical. For the large plant individual circumstances will decide. If our competition is to be heavy oil, however, we should not be dismayed by the apparent lower cost of fuel but proceed to point out the auxiliary costs and disadvantages that in many cases have swung management to the lighter oils.

Oil Standards Vary

This leads us to another feature that concerns fuel oil, and that is the question of uniformity of product, even for a single grade. There is no public service commission policing the existing standards; and regardless of the efforts of the well established oil distributors, who can be counted upon to do their best to maintain standards, various tank car loads will differ one from the other. Nearly any plant manager using sizable quantities of oil can tell of an occasional "bad" lot of oil, a car that gave all kinds of trouble, perhaps frequent clogging of the nozzles causing undesirable shutdowns, perhaps too high in sulphur content, perhaps containing a larger than normal quantity of sludge or even a sizeable amount of water. The losses in production on such occasions are often extremely costly and serve to emphasize the value of gas fuel the uniformity of which is the same day after day, assured through careful manufacturing practice carried on under strict state regulation and inspection.

Oil Storage

With oil, as with the solid fuels, the problem of storage enters. With both, demand must be anticipated, orders placed and cars unloaded. Storms, strikes, transportation troubles, all hinder deliveries and make advisable sizeable stocks on hand. Oil is stored in tanks, below or above ground, of a size adequate to hold somewhere between a week's and a month's supply. If delivery is by tank car, then the storage capacity must exceed the usual 12,000 gallon capacity of each car. These tanks must be cleaned occasionally, as a sludge gradually accumulates. Such cleaning is a dirty job, and the sludge and sediment that is removed each time represents a loss, since the sludge was purchased at the same price per gallon as the fuel oil of which it was a part. Then too, underground tanks have been known to leak, and many dollars worth of fuel seep away thru the earth. Capital is tied up in the stored oil and interest on this investment is part of the cost of using fuel oil. Compare these conditions with those when gas is used. A pipeline connecting with the utility's supply. A meter to register the consumption. Payment after use and only for the fuel actually used. No worries regarding deliveries. No losses. An accurate accounting of the fuel used each month. No storage problems. Simplicity and economy.

Expense of Transfer to Burner

The next problem in the utilization of fuel oil is the means whereby it is carried from the storage tanks to the burners. We have already stated that pumps, usually driven by electric motors, are employed for this purpose. With Bunker B and C oils heat must first be applied to the oil in order to make them fluid enough for the pumps to handle. Steam is the usual source of this heat, introducing the added complication of a boiler operating twelve months of the year, not to mention the value in dollars and cents of the steam itself. The pumps with their conventional moving parts are subject to natural wear and tear, depreciation, maintenance, and service. A motor or pump failure means a breakdown in production and possible heavy losses. A skilled mechanic is a necessary adjunct of such

Table 2

Cost of Air for Burning Fuel Oil

Type of Machine	Usual Pressure Range	Common Pressure for Oil Burning	Approx. % of Total Air that can be induced	Energy to compress 1M cubic feet	Cost to burn 1 gallon of oil with induced air as shown
Fan, Centrifugal Blower	8-24 oz.	12 oz.	45%	.075 KWH.	.0747 cents
Turbo-Compressor	¾-2 lbs.	2 lbs.	60%	.195	.14
Positive Pressure Rotary Blower	¾-10 lbs.	5 lbs.	70%	.625	.338
Reciprocating Compressor					
One stage	20-80 lbs.	40 lbs.	84%	1.85	.531
Two stage	80-100 lbs.	80 lbs.	88%	2.63	567

Notes:—Cost of electricity assumed to be 1 cent per KWH.
Air for combustion of one gallon of oil assumed to be 1,800 cubic feet.
Energy is that necessary to compress 1,000 cubic feet of free air to the pressure shown.
The % air induced figures are ideal. In actual practice the average is about 50% of that shown. This varies widely with burner design and local conditions.

a system, as well as a stock of repair and replacement parts. The electricity for the operation of the motors is, of course, another item of expense.

At the burner itself another cost is involved, and that is for the combustion air. Gas in the lower temperature ranges (say below 900° F) employs the Bunsen principle in many of its burners to draw in from the atmosphere all necessary primary air, and takes from around the flame the necessary secondary air, thus demanding no air under pressure. For the higher temperature operations, if gas under pressure is available, all the combustion air is still drawn from the atmosphere. If, however, only ordinary line pressure gas is at hand and it is not deemed advisable to compress the gas, then air under pressure is necessary; but the air pressure need only be a few ounces or a pound at the most. Only the theoretical amount of air is required, since as discussed above, a neutral flame is easily obtained and is, of course, the most efficient. Thus, with gas the maximum air demand is between 8,400 and 9,400 cubic feet at 16 ounces pressure per 1,000,000 Btu's of fuel, costing approximately $0.0084 to $0.0094, assuming electricity at 1 cent per KWH (See AMERICAN GAS JOURNAL, February, 1938). The lower figure is for manufactured gas with its higher Btu per cubic foot of air-gas mixture and the higher for natural gas.

With the conventional oil burner, air under pressure is a necessity. In the usual domestic type used in house heating, the air is furnished by a fan that is incorporated in and forms an integral part of the burner. In the typical industrial installation, however, the air supply is independent of the burner, serving more than one burner and furnace at a time. This air pressure may be anything from 8 ounces to 100 pounds, depending on burner design. With the possible exception of the very low pressures, however, usually a goodly part of the total air is drawn in or induced from the atmosphere by the inspirating effect of the air under pressure. The exact proportion of induced air varies with burner design and air pressure, increasing, of course, with increasing air pressure. The accompanying table, Table 2, gives the maximum amounts of such air induction and the minimum cost of each type of air supply to burn a gallon of oil. In actual practise the average figure of air induced would be nearer 50% of the amount shown in the table, and hence the actual cost of air considerably more than the figure given in each instance. It does illustrate, however, how air cost multiplies rapidly with increasing pressure, and what a factor of cost it really represents. Thus, when using 40 pound air, a not uncommon plant practise, the cost per gallon of oil is not less than .53 cents, or some 3.8 cents per 1,000,000 Btu's in the oil.

(The next article will continue the discussion of oil competition and give a number of examples taken from the writer's own records.)

Partlow Temperature Controls

This Gas Oven is equipped with a **Partlow Temperature Recording Controller** which assures correct temperature regulation. Charts tell the complete story of what is going on inside the oven.

The **Partlow Saf-T-Flame Gas Pilot** insures safety by shutting off the entire gas supply instantly in case of Gas or Electric failure.

Modernize with Partlow

The Partlow Corporation

New Hartford (Suburb of Utica), New York

Offices in Principal Cities.

"WHAT A LOT OF PIPE A MERE HANDFUL OF WORKMEN CAN LAY—WHEN IT'S A DRESSER-COUPLED LINE!"

Pick up . . . stab . . . couple! That's the one-two-three routine that "eats up the miles"—permitting an uninterrupted jointing and completion of the Dresser-coupled line, even faster than the ditcher can dig. In one typical case, 5.2 miles of 5½" O.D. pipe were laid and backfilled in eleven hours. In another, a crew of only 24 men completed almost one mile of 10" I.D. pipe in 8 hours.

DRESSER
MANUFACTURING CO. • BRADFORD, PA.
230 Park Avenue, New York, N.Y. Peoples Gas Building, Chicago, Ill.
Shell Building, Houston, Texas
In Canada: Dresser Mfg. Company, Ltd., 60 Front St., W., Toronto, Ont.

NOTE TO READER: This is the twenty-fourth in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin 351.

Now 250 "Carboseal" Anti-Leak Users

Records show how this low-cost method corrects leakage in dry bell-and-spigot joints . . .

250 gas companies the country over are using "Carboseal" anti-leak to reduce leakage in bell-and-spigot joints in dry gas distribution systems with minimum trouble and expense. The results they have obtained you can expect to get in your mains. A few of these results are reported at the right.

How "Carboseal" Anti-Leak Works

"Carboseal" anti-leak is a scientifically developed liquid. It is normally introduced at high points in the mains and allowed to flow over the joints to the drips by gravity without interrupting gas service, or it can be sprayed into the mains by means of a hose. Expensive excavation is eliminated. "Carboseal" anti-leak cuts tar and gum deposits in the joints and saturates dried-out jute packing, swelling it to its fullest extent and stiffening its fibers, so that the packing fills the voids.

Joints treated in this way keep gas where it belongs because they are gas-tight, and remain tight indefinitely. Joints treated six years ago are still tight today on the soap test.

For further information about this effective and inexpensive method of correcting leakage in packed bell-and-spigot joints in distribution systems carrying dry manufactured or natural gas, write for "Carboseal" anti-leak bulletins C1-4, which will be sent without obligation.

TYPICAL REPORTS

NEW YORK STATE—In a system consisting of 14.7 miles of 3-in. equivalent low-pressure mains and 4.7 miles of 3-in. equivalent mains carrying 5 to 8 pounds intermediate pressure, the latter were treated with "Carboseal" anti-leak in 1936. The unaccounted-for gas volume was reduced 85.3 per cent by December, 1938—two years after treatment. This reduction was largely due to "Carboseal" anti-leak. The low-pressure mains in this system will be treated this year.

. . .

GEORGIA—In June, 1936, "Carboseal" anti-leak was applied 6 times in 4 weeks to 44,000 ft. of 4-in. main. Total unaccounted-for gas volume was reduced 60 per cent and bar tests showed elimination of joint leakage. The loss remained the same when metered in June, 1938.

. . .

ILLINOIS—A utility treated 545 cement joints in 4-in. main with "Carboseal" anti-leak at a total cost of $442.68, or 81.2 cents per joint. The annual leakage per mile of 3-in. equivalent main dropped 95.4 per cent.

. . .

TEXAS—In October, 1936, "Carboseal" anti-leak was applied to 881 ft. of 4-in. main. The annual unaccounted-for loss was reduced 96 per cent by this treatment. This figure was still the same when checked in March, 1938.

. . .

MISSISSIPPI—Shut-in meter tests showed a leakage reduction of 97.5 per cent after "Carboseal" treatment. Soap tests showed that even "blowing" leaks were eliminated.

For information concerning the use of "Carboseal" anti-leak, address

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

The word "Carboseal" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

Experiences with Carboseal

By
F. G. H. Elliott
San Diego Consolidated Gas and Electric Company

DURING the past several years considerable work has been done in this country in the treatment of old cast iron mains with "Carboseal", and similar materials, for the purpose of reducing leakage. These materials have been described in other papers presented to this Association and the American Gas Association and it is not necessary to repeat the details here. Suffice it to say that under favorable conditions Carboseal may be injected into mains in which the joint packing has dried out and its absorption by the packing will cause the jute to swell sufficiently to close off seepages and minor leaks. We have used it in an experimental manner for about two years and in this report we describe four jobs which serve to illustrate some of the methods which may be used.

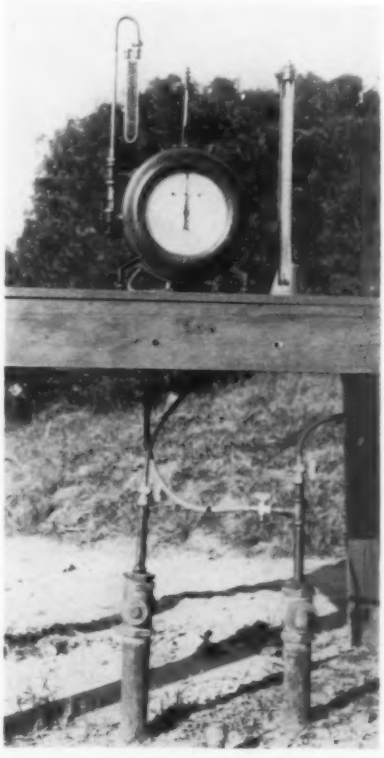


Fig. 1: Displacement meter for measuring leakage.

In one section of our low pressure distribution system we have an 8 in. cast iron main laid in 1926 with bell and spigot joints caulked with cement and dry jute. It was possible to meter the leakage in this section before and after treatment with Carboseal by installing valves temporarily in the line and the necessary pipe and fittings to connect a meter. (Fig. #1) This main is 980 ft. in length and the street in which it is located is paved with concrete. It parallels an underground telephone system and routine tests showed that gas was seeping into the manholes. The usual gad holes were made over the main for testing with a leak detector. To keep dirt out of these holes we inserted tapered redwood plugs with a ½ in. hole in the center for future tests. (Fig. #2)

A rather steep hill is near the center of this section of line and pipe connections were installed for pouring Carboseal into the main at the crest of the hill. Drip pots were already in place at the low points. The liquid flowed rapidly down the inside of the main and contacted all of the joints within a short time.

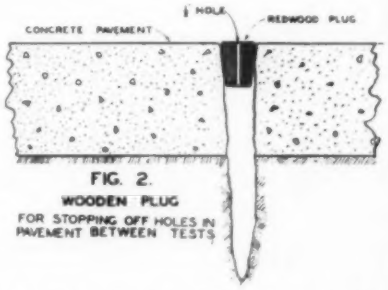
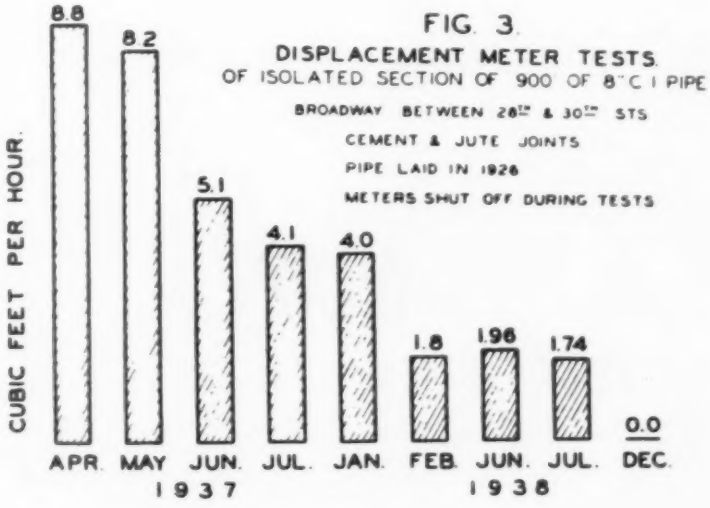
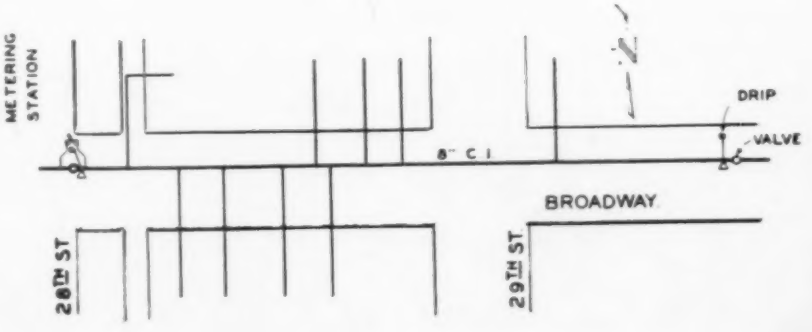


FIG. 2.
WOODEN PLUG
FOR STOPPING OFF HOLES IN PAVEMENT BETWEEN TESTS

Reduction in Leakage

Before any Carboseal was injected the meter showed leakage of 8.8 cu.





Presented for discussion at the Spring Meeting Technical Section, Pacific Coast Gas Assn., March 23rd and 24th, 1939, at Los Angeles, Calif.

ft. per hour with customers' meters shut off. Three weeks after the first treatment the leakage dropped to 5.1 cu. ft. per hour and after the fifth treatment to 1.8 cu. ft. per hour. (Fig. #3) There was no further reduction in leakage until three joints near the top of the hill had been fitted with leak repair clamps. Because of the peculiar local conditions the Carboseal did not reach these three joints and tests with leak detectors showed that they were seeping gas. Before checking with leak detectors the gas was purged from the soil under the pavement ("aeration"). This expedited the locating of the three leaking joints as a considerable area showed concentrations of gas under the pavement before aeration. After the three joints at the top of the hill were clamped the test meter showed no leakage. The wooden plugs were removed from the gad holes in the pavement with a special wrench (Fig. #4) and the holes plugged with cement.

The original leakage in this section was equivalent to 415,000 cu. ft. per mile of 8 in. per year. The valves

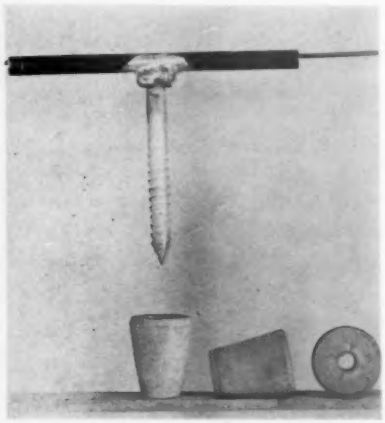


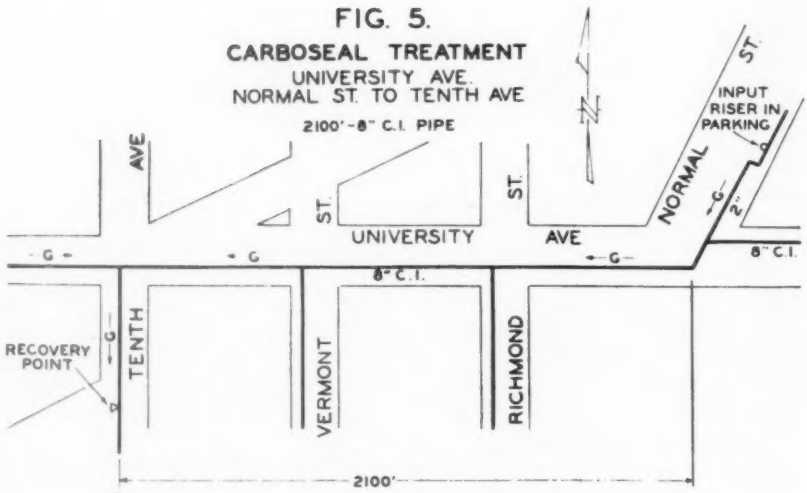
Fig. 4: Gad hole plugs and special wrench for removing same.

and meter connections have been left in for future leakage tests and it will be interesting to see if these joints start seeping again.

Procedure Using Leak Detector

Another section of the low pressure system which was treated with Carboseal consisted of 2,100 ft. of 8 in. cast iron pipe laid in 1911 with bell and spigot joints caulked with lead and jute. (Fig. #5) This line is located in a heavily traveled street beneath 8 in. of concrete and asphalt pavement. It was not possible to isolate this main for metering the leakage and the seepages in the pipe joints were found by the usual method of testing gad holes with a

FIG. 5.



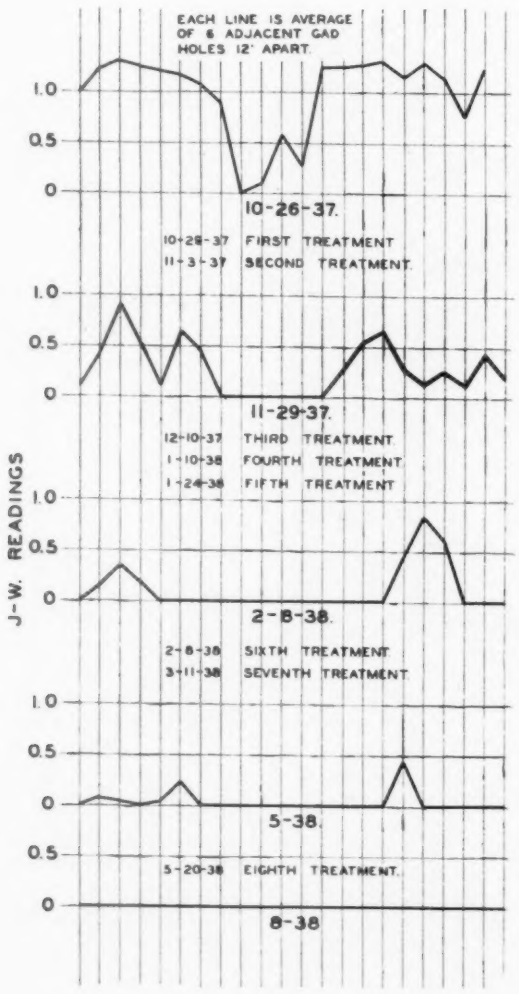


FIG. 6.

GAD HOLE TESTS
DURING CARBOSEAL TREATMENT

UNIVERSITY AVE
NORMAL ST TO TENTH AVE

2100'-8" C.I. PIPE, LEAD & JUTE CAULKED JOINTS.

PIPE LAID IN 1911

DIFFERENCE IN ELEVATION NORMAL TO TENTH = 19.9'

leak detector. These tests showed accumulations of gas beneath the pavement over the entire length of line. The fall in grade was only 19 ft. in the 2,100 ft. and the Garboseal traveled slowly.

Carboseal was introduced through a 2 in. low pressure main in the parking of a side street at a point 150 ft. from the intersection of the 2 in. main with the 8 in. and the first treatment consisted of 30 gallons. Five days later another 30 gallons were added followed by 20 gallons six weeks after that. Ten days after this last treatment the first trace of Carboseal appeared in the drip pot at the low point in the opposite end of the 2,100 ft. line. Two days later 2½ gallons of Carboseal were collected from this drip pot and recoveries continued for a month after the last treatment. Five additional batches were added over a period of four months.

Aeration of the soil beneath the pavement and tests with a leak detector were carried on at regular intervals and within one month after the first treatment definite improvement was noted. (Fig. #6) Three months after the last treatment (ten months from the first treatment) the test holes were entirely clear of gas.

245 gallons of Carboseal were put into this line and 145 gallons recovered in the drip pot. The net use of 100 gallons is somewhat higher than reported by other companies for this size of pipe. An inspection of the interior of the main showed an accumulation of about ½ inch of dust in the bottom of the pipe and it is probable that some of the liquid was absorbed by this dust. It is estimated that the saving in the use of Carboseal over the cost of installing leak clamps amounted to $9.00 per joint on the job.

Use of the Hose Method

We treated one 200 ft. section of 4 in. cast iron bell and spigot low pressure main by the hose method. That is, a nozzle on the end of a hose was pushed through a tap hole in the pipe and the inside of the main was sprayed with Carboseal. Results in stopping leakage were accomplished more quickly by this method but we believe that in general the gravity method is more adaptable to most situations. The hose method has been described by Mr. R. E. Finley, Vice-President, Dayton Power & Light Co., Dayton, Ohio, in his paper of April 12, 1937 entitled "Further Use of Carboseal in Reducing Joint Leakage.

Fogging Mains

We were able to isolate one small district of the low pressure network serving 300 customers for a test of fogging mains with Carboseal. A master meter was installed for comparing the gas input to this system with the registration of the customers' meters. No difficulty was experienced with the fogging apparatus when the Carboseal was absolutely clean. Test ampoules indicated that the fog spread throughout the area within three weeks. At this time pilot outages in appliances increased in one remote corner of this district which is at an elevation of about 100 ft. above the fogging station. These outages became so troublesome that fogging was discontinued and within a few days the complaints had stopped. Two months later we started fogging again and within a week pilot trouble started and the fogging apparatus was shut down.

During the comparatively short time which the fogger operated there was no appreciable change in the rate of leakage but a longer period of fogging might have shown beneficial results. We were unable to determine the direct effect of the Carboseal which caused the pilot outages, either by laboratory or field tests but it may be that the vapor stratified sufficiently to cause momentary interruptions in the flow of gas to these small flames.

Conclusions

Our rather limited experience indicates that Carboseal will stop seepages in bell and spigot joints of cast iron pipe if the jute packing is in sufficiently good condition to serve as a wick but it will not stop "blowing" leaks. That is, those leaks of such size that the jute cannot expand enough to seal them. It has been six months to a year since the jobs described above were completed and so far there has been no recurrence of leakage but we will continue our tests at regular intervals to determine when additional treatment is necessary.

Whose Business is Who's

1/9 All Electric Power Produced in 1938 Made By Burning Gas

Like amazing figures? Here's one to remember. One ninth (1/9) of all the electricity generated in the United States is developed by burning gas—or, in other words, 11 per cent of the national electric load is, if traced back to ultimate sources of energy, actually a gas load.

From statistics just released by the Statistical Department of the American Gas Association through that Association's Industrial Gas Section, some 172,500,000,000 cubic feet of natural gas (averaging 1100 Btu of heating value per cubic foot) were sold for electric generation in steam power plants during 1938. By standard methods of computation* it can be shown that this gas generated about 12,650,000,000 kilowatt hours of electric energy.

According to the Edison Electric Institute's latest estimates 113,850,000,000 kilowatt hours of electric energy were produced in 1938 by the electric light and power industry—67,600,000,000 kilowatt hours of the total being generated in fuel burning plants.

Any slide rule will show that 12,650,000,000 is 11 per cent of 113,850,000,000—or 19 per cent of 67,600,000,000. That is, one out of every nine kilowatt hours of electricity produced in any manner—or one out of every five kilowatt hours produced in fuel burning plants—is produced from natural gas.

It could be said that every ninth electric light, motor, vacuum cleaner, or street car is run on gas.

** For this computation an average steam plant efficiency of 22.8 per cent is assumed. This is the same as assuming a load factor of 50 per cent and using the standard equation for Heat Rate:*

$$\text{Heat Rate} \left\{ \begin{matrix} \text{Btu to generate} \\ \text{one kwh} \end{matrix} \right\} = \frac{13{,}000 + \frac{100{,}000}{\text{Load Factor}}}{} = 15{,}000 \text{ Btu/kwh}$$

Arthur J. Smith

Building Up A Run Down Gas Plant

By

Arthur J. Smith

Maquoketa Light & Heat Company

THE Maquoketa Light & Heat Company is located at Maquoketa, Iowa, one of the nicest little county seats in the state. The population is made up principally of retired farmers; there are no industries, and it is a place where you would like to live.

The gas plant at one time held the record of being the most attractive little property in the state in a city of its size, both from an earnings standpoint as well as on the basis of number of meters per capita, this being 3.6 people per meter, or 1000 meters and 1059 services. The depression came along and the city decided also to add a municipal electric plant to the already existing high tension electric system, making two electric systems competing and bringing current down to 2c per K.w.h. for cooking and 1½c per K.w.h. for off-peak water heating. Along with this there are four bottled gas offices set up with display rooms, about a dozen different places selling oil burners, and still others selling stokers and coal. All of this made pretty keen competition for a carburetted water gas plant selling gas of 535 B.t.u. at $1.90 per thousand cubic feet.

The plant had been sliding backwards for about 6 years; and from the 1000 meters, it had reached the low figure of 502 meters a year ago last February.

Having spent a good part of my life in the gas business and being very much attached to it and its possibilities, I made a deal for the plant to own it and work it out of the depression, and try and bring it back again to the best little gas plant in the State of Iowa.

So on the 22nd of August, 1937, I came to Maquoketa to battle with competition. To me this seemed easy, for I have always felt that I could go out and talk gas and make the customer believe in it regardless of the competition, and have never once let myself believe that with an electrical Kilowatt of 3412 B.t.u. against a gas like I am carrying of 700 B.t.u., the electrical man had a gambler's chance against me.

Improving the Service

Before entering into a strenuous campaign for new business I decided to raise the gas pressure for the full 24 hours to about one-half more than the holder pressure, next to raise the B.t.u. to 700. This was to show my customers that they were really getting something for their money as well as to show them that they were getting service. I have always felt that the greatest kind of salesmanship is a satisfied customer. Leave it to him to sell the other fellow. With this really accomplished, one-half of the friction was over, and we began to go to town right from the start.

House Heating Campaign

Winter was coming on and the first thing I did was to put on a small heating campaign, just enough heating customers to about double our sendout. Although it was not so very profitable it got the customers interested, for it had not been tried in a large way before; and they began to feel that gas must be cheap if houses could be heated with it. I followed this right up with a display at the gas office every evening, showing the various kinds of heating burners in operation. This attracted the attention of crowds that would come in just to see them operate. I would talk to them on going back to gas for cooking and baking and water heating, etc., as well as for light house heating. I would go out and see them in their homes during the day; and the result was that we averaged about a job a day all through that winter, either an additional appliance for an existing customer or a new customer back on the lines that were already installed but idle.

Dressing Up Plant and Surroundings

We followed this up by taking the plant and making it look like a million dollars inside and out, including the surrounding yards. We put in about 50 evergreen trees in the front yard, fixed the building up in good

shape, built an 80 ton cement stucco coal bin, erected gas arc lighting in the front yard, lettered the gas holder with the words, "USE GAS—TO HEAT, TO COOK AND HEAT WATER" on three sides, lettered the tanks, etc., did a lot of painting inside and out, used several different colors on the inside for the different rooms, erected three square brick pedestals in the front yard and painted them white so they looked like the entrance to some large estate.

A Better Looking Office

We followed this up by making the office look like a national bank by purchasing all the fixtures of a bank that consolidated with another and installing them in the gas office. We painted the walls, painted the floors, put in a new cement floor in the fitting room underneath the office, got our meter prover in shape for testing meters, arranged to repair our own meters without sending them away and lighted the office with gas arcs, etc.

When our customers come in now to the gas office some of them start to go out thinking that they are in a bank, until they are convinced that they are really in the gas office.

I have always felt that in the bringing up of any business there are just a few things that are outstanding, and the vital ones are (especially in a utility business): Service, Quality of Service, Reasonable Service, and a Prosperous Looking Company rendering that service. For in a utility that is serving hundreds of customers there is always the fear, when they are approached to purchase a new stove or water heater, that the plant might shut down and leave them holding from one hundred to several hundred dollars worth of appliances. A look of prosperity helps to eliminate that fear.

Load Building Methods

Just a word on load building. I started in this fall with Radiantfire Heaters and put out a lot of them, selling as many as five of them in one-half day. I would carry the heater right into the house, set it down in front of the customer and sell it to him or her on its appearance in the fireplace and on the wonderful thing it is, even though they had a furnace and were using coal. I sold them on the idea of using it for instant heat when the furnace was down, or before it was up in the morning. A person would be surprised how those little things will build up the gas load.

As a result I have put on about 250 new customers and 366 jobs in a little over a year. I now have in the neighborhood of 750 customers and am continually getting more.

I still have a lot of idle services but they are coming back to gas one by one. About two weeks ago I employed a man to go around and do adjusting of appliances. That makes him welcome in every home, as the service is free; and while there, he checks on all opportunities for gas service and the kind of appliances needed. He makes sales where he can and collects delinquent bills, as collecting is an important thing these days. I feel that is good advertising for he can sit down and spend time with the customers and explain what they want to know. His compensation consists of a small salary and a commission on sales, with an additional commission for each new customer, together with commission on collections of delinquent gas bills.

The Newly Equipped Office and Salesroom

Service That Satisfies

My hours are from before daylight in the morning until 10 o'clock at night. I like the work. There seems to be an inspiration to me in the bringing up of a run down plant; and getting customers back on the lines has always appealed to me. There is nothing in my mind that will bring them back faster than service, quality of service, and a company behind that service that at least looks capable physically and financially of rendering that service.

Summing the whole thing up in a nut shell it resolves itself down to this: If you like your work, if you believe in your work, if you fairly live your work and are thoroughly convinced that you have a product that is the best and the cheapest and the most satisfactory for your customer, and if you are convinced that you can make your customer like your product, then there is no other utility that can compete with you if you give your customer a fair break.

The sooner we all get together and talk in terms of British Thermal Units, the sooner I feel that we will be able to convince our customers, in a clear way so as they will understand, that we are giving them much more for their money than any other utility. The electric man talks in cents and we talk in dollars, and if we can just use a unit that is equal to the K.w.h. in B.t.u.'s it will not be hard for us to readily convince our customers that our product is several times cheaper. This is the argument that I use in selling gas in all forms. I try to show them how much they are getting for their dollar compared with what the competing utility is giving them for their dollar, and it mostly always wins.

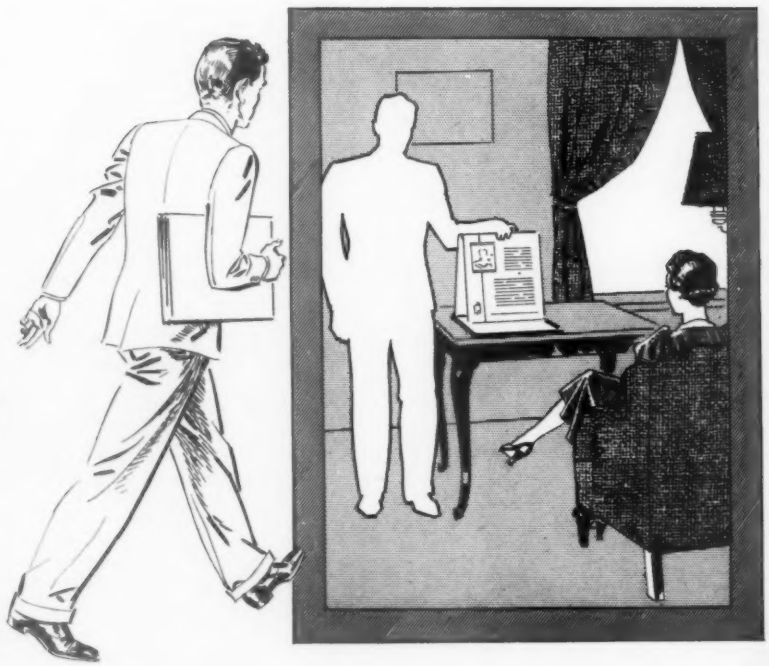
New Appliance Aids

A great many of us gas men are not paying enough attention to new appliances. The new appliance of today is so much cheaper to operate, so much nicer and handier as well as more attractive to operate, that we lose some of our best gas customers as gas users by failing to sell them new gas ranges. Our competing

(Concluded on page 50)

STEP INTO THE PICTURE

AND MAKE MORE SALES WITH PITTSBURG



IT is natural that the oldest Automatic Water Heater Company should offer its dealers help that will secure the "lion's share" of the water heater business.

Pioneering, time-tested experience and skilled craftsmanship are embodied in the 1939 Pittsburg Automatic Water Heaters.

Pittsburg's line is years ahead of the field. It is complete both in models and sizes to meet every conceivable consumer requirement.

Use the "Sales Planner" . . . "Sales Finders" . . . "Sales Maker" to sell the Pittsburg Automatic Water Heaters for an outstanding profit earning year.

PITTSBURG
GIVES YOU THE MOST COMPLETE LINE OF AUTOMATIC GAS WATER HEATERS

- **STORAGE MODELS**
  7 sizes with Galvanized Tank.
  Capacities 7½, 15, 20, 30, 40, 50 and 75 gallons.
  5 sizes with Copper Tank.
  Capacities 20, 30, 40, 50 and 75 gallons.
- **LIQUEFIED PETROLEUM HEATERS**
  4 Sizes with Galvanized Tank.
  Capacities 20, 30, 40 and 50 gallons.
- **MULTICOIL STORAGE SYSTEMS**
  4 sizes with Galvanized or Copper Tank.
  Capacities 80 to 5,000 gallons per hour.
- **CONTINUOUS FLOW HEATERS**
  7 sizes—Copper Coil Type
  Capacities 1½, 2, 2½, 3, 4, 6 and 8 gallons per minute.
  2 sizes—Fintype, Preheater.
  Capacities 2½ and 4 gallons per minute.
- **TANK HEATERS**
  5 sizes—Copper Coil, Cast Iron Jacket.
  Nos. 1B, 1M, 1½B, 1½M and 2.
- **HOUSE HEATING SYSTEMS**
  Full capacity to 555 sq. ft. of direct cast iron radiation.

EVERY SIZE AND EVERY TYPE OF HEATER FOR EVERY CONCEIVABLE REQUIREMENT

PITTSBURG WATER HEATER CORPORATION
PITTSBURGH, PA.

"Let Us Look at the Record"

By
A. M. Beebee
General Supt., Rochester Gas & Electric Corporation

WE HAVE heard a great deal on the desirability of a balanced budget. In reality, a balanced budget means merely "sound economics." In other words, it means that the disadvantages are counterbalanced by advantages. But a mere balanced budget gets nowhere. Under such conditions, matters stand still, and history during such periods tells us we are apt to begin to fall behind.

If our budget shows a deficit, then certainly we are hastening the backward spiral. However, if our budget shows a surplus, then indeed we have an opportunity to progress.

Let us analyze the budget of the gas industry. I do not mean a dollars and cents budget. That involves mere arithmetic that can easily be developed, if the fundamental economics of the industry are sound. I mean, let us see what the fundamental economics of our industry are. Is the economic budget of the gas industry balanced, or does it show a deficit or a surplus? In other words, are our advantages greater, the same, or less than our disadvantages?

Let us first consider what the Gas Industry's economic liabilities are:

Liabilities:

1) Our biggest bond issue is due to the fact we have pretty generally monopolized the cooking fuel requirements of our country. This is at present perhaps our largest and most important responsibility. Can we meet the issue when due, and can we even carry a greater liability in this regard?

2) We have a second bond issue in providing the water heating needs of the communities in which we operate.

3) We have a preferred stock issue in the refrigeration needs of customers.

4) We have a preferred issue in the house heating fields.

5) We have considerable common stock in the industrial heat markets of our country.

6) We should carry a reserve to overcome the popular impression which has been associated with our industry.

7) We need a depreciation fund to meet the threatened loss of markets to other fuels.

8) As to whether we have a surplus or a deficit depends on whether or not our assets exceed these liabilities, and we cannot determine this until after we have evaluated our assets.

Therefore, let us next consider our assets.

A paper presented at the 13th Annual Business Conference of The New England Gas Association, Boston, Mass., February 16, 1939.

Assets:

1) **Plant Property** — Our main plant item consists of a number of complicated forces of value. Let us analyze these factors on which our industry rests, as follows:

(a) Gas and electricity are merely convenient forms of transmitting energy. Where light and power are concerned, gas has no particular advantage. However, where heat is desired, it can generally do three times as efficient a job as can electricity, in delivering the energy in a fuel into useful energy available to a consumer. This is due to the conversion efficiencies inherent in the processes, details of which are covered in a previous paper "Economics of Energy Distribution"—1936 A. G. A. Convention.

(b) A corollary to the above is that less investment is likewise required for gas to perform this service, so that in general such transportation of energy can take place at a cost to the customer of about one-half that needed for electricity. Details are covered in "Time Marches On—Where is Manufactured Gas Marching?"—1938 A. G. A. Convention.

A particular point in this connection is worthy of again repeating which is taken from those most interesting studies of Mr. Russell and Mr. Ginna on the relative costs of serving the domestic customer needs with gas and with electricity. These studies show that a combination gas and electric service for lighting, cooking, water heating and refrigeration is to the best interest of the customers, as well as the company, and requires a total investment only 2/3 that of the all electric idea. These studies show that the all electric cooking and water heating service to the customer, is only profitable to the company at a cost to the customer twice the cost of equivalent gas service. At equal costs to the customer, it is ruinous to the company.

Another interesting set of data in the previously mentioned paper, "Economics of Energy Distribution," shows that these domestic services are now being supplied to a customer at existing gas and electric rates by the combination gas and electric service at a cost lower than a similar all electric service, even at the proposed New York State Power Authority rates. It is clear, therefore, that a combination gas and electric service is doing already a better job than the Government hydro programs hope to be able to do with subsidized rates. How, then, is anyone being helped by these Government hydro programs, particularly when one considers the detrimental effect that they have on the mines and railroads? This point will be discussed later.

(c) It is surprising that heat requirements of a community are far in excess of the requirements for light and power and therefore, the fields available to gas from the above fundamentals are indeed great. A simple calculation to visualize all this is as follows: Electricity has already obtained a large share of the light and power requirements of most communities. Yet even when allowing for the fact that 70% of the typical electric company load is used to supply industrial power, and while only 30% of the typical gas property load is used to supply industrial loads, it is interesting to note that the energy used in the present typical community in the form of gas is more than in the form of electricity. This is rather surprising. Let us take a typical example of our own Company. Our annual kilowatt hours sold, including all our industrial power load, is slightly over 400 million kilowatt hours x 3,412 B.t.u. = 1.3 trillion units of energy. Our annual gas load, with its much smaller industrial load, is slightly under 5 billion feet x 537 B.t.u. = 2.7 trillion units of energy or about twice as much in the form of gas. After considering the relative efficiencies of utilization by the customer, it is apparent that while the amount of energy actually used comes closer together, even now we are supplying more useful energy in the form of gas to our customers than our sister industry. It is further interesting to note that for this somewhat smaller amount of energy our electric customers paid over 10 million dollars, while our gas customers paid only a little over 4 million dollars. When we consider the energy used in the typical average home today in this country, the ratio is from 8 to 1 in the form of gas as compared with electricity. Indeed our large load looks good to those who have electric power to sell. Furthermore, when it is realized the large amounts of coal and oil used in a typical community, it is at once apparent what a small portion of the heat needs of that community are now supplied by gas.

This merely goes to prove practically the effect of the points we have tried to develop earlier. We now begin to realize that the gas industry is a real purveyor of energy, more than is usually realized and perhaps has some of the characteristics of Cinderella, i. e., of inestimable value and charm but unappreciated. Therefore, we have a plant of real value and service to our social welfare.

2) Materials and Supplies: The source of energy for our industry be it coal, oil, or natural gas comes from nature's storehouse of which this country is blessed with an almost unlimited supply. While the present known reserves of gas and oil of the country are only equal to a comparatively few years at present rates of use, the coal reserves are tremendous and will last several thousands of years. Therefore, the main materials and supplies of our industry are, for practical purposes, unlimited.

3) Notes Receivable: While we have

pretty well saturated the cooking markets of our country with gas, our water heating market is only about 10 to 20 per cent saturated, and our refrigerating and house heating markets even less so. Our "Accounts Receivable," therefore, are indeed great and in general are awaiting our service, as soon as the purchasing power and improved standards of living of our country will allow it.

4) Investments: Since our major source of energy is coal, we have considerable interest in the mines, railroads and heavy industries that supply them, all of whom are large employers of labor. We are therefore contributing to the building of the purchasing power of the country, relieving the unemployment, and helping to spread the wealth, which should enable eventually a higher standard of living and a resultant broader market for our products. For further details on this, please see the "Time Marches On" article previously referred to.

In this connection it is again important to call attention to the tendency of subsidized Government hydro programs designed to supply those markets which we now are and are capable of supplying more economically. These hydro developments, when completed, involve a minimum of labor and in general do not produce power as economically as could be produced from coal. This fact becomes more impressive when we realize that the effect of the Government hydro electric development, proposed and in operation, is equivalent to more than half of the coal production of this country. When it is realized that at the present time coal only supplies 45% of our energy requirements contrasted with the 60% supplied in the 1923 to 1929 period, when unemployment was relatively unknown, it would seem to be a "stop, look and listen" warning sign, as to the practical effect of such changes.

5) Working Capital and Cash in the Bank: This item consists of our existing loads—particularly the domestic cooking load, which has frequently been a subject of much speculation. In the time available, it is difficult to discuss all the relative factors involved. However, since the domestic cooking load is our greatest cash reserve and since our greatest bond issue is the satisfying of this responsibility, perhaps we can be justified in discussing this phase of our business at length.

Fundamentals of the Cooking Load

While from the above figures it can be shown that gas for cooking is more efficient in energy used than electricity, and more economical to the customer, nevertheless this is not the entire picture. If electric cooking provided a character of service superior to gas, then these factors may be justified, just as the automobile outmoded the horse and buggy.

The fundamental reason why cooking in a gas oven is more productive of uniform results is because gas ovens rely almost entirely on convected heat in addition to their throttling control and are therefore unaffected by shadows in the oven. The "full on and full off" operation of electric ovens plus the effect of the "sun rays" and radiant heat as changed by shadows cast in the oven by utensils unless designed to use convected heat, is more of a factor than is ordinarily realized and requires skill and care in order to get desirable results.

Tests which we have run show that the heat distribution in a modern gas oven is most remarkable, showing only from two to five degrees variation for any one point in the oven, as well as when compared with any other point in the oven, and as compared with from 30 to 80 degrees variation in modern electric ovens.

We hear electric range enthusiasts claiming that their ranges are capable of time temperature control, so as to enable uniform cooking results. In this way they have again tried to cover up a point where they are vulnerable. They have said gas ranges are affected by variations in heating value of the gas and by the pressure, but they have failed to state that variations in voltage have four times the effect on the output of electric ranges, that equivalent variations in pressure have on gas ranges.

One interesting side light on this situation is that modern electric ranges have a total demand equivalent to nearly a 15 H.P. motor. If uniformity of voltage is to result, in order to avoid flickering lights and to provide the much touted "uniform cooking," expensive construction and wiring, as well as distribution facilities, must be involved.

For all these reasons, it is difficult for me to see where electric cooking while an excellent method of cooking, if gas is not available, is to be compared favorably with "flame cooking" from a modern gas range.

There is another matter that might properly be mentioned at this time. One of the most recent activities of the electric range advocates is to place great stress on the fact that the average electric range equals or exceeds all the 22 new requirements of the recently featured CP range of the gas industry. While this is very flattering to have them compare their ranges with modern gas ranges and claim they are their equal, it should be borne in mind that these 22 requirements of the CP range were put in to correct the points in gas range design that were lacking in performance, but gave absolutely no consideration to the points in gas range design where it has already excelled, and in which electric cookery is inferior.

In other words, it had never seemed important that gas ranges should have a specification saying that the temperature variation in the oven at any one point should not vary more than 5 degrees from the thermostat setting, nor should it vary more than 5 degrees from any other point in the oven. Gas ranges can easily do that, so why specify it? However if such a specification is included, as I understand will soon be the case, then let us see the electric ranges meet that most important specification.

We are prone to hear much of the ability of electric ranges to provide the clean and cool kitchen. This feature, consumer surveys show, has unquestionably been "sold" to the public generally. Again, let us see what the facts are, and in this we find no one but ourselves to blame for letting them get away with it.

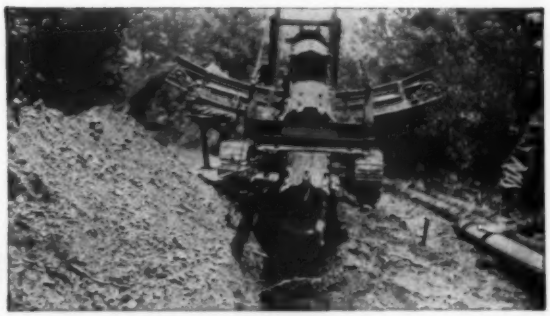
About the only advantage that the electric range has over an unflued gas range, and which may be a virtue or a vice, depending on the point of view, is the matter of less heat in a kitchen. In older houses, most of which do not have adequate heat in the kitchen, this feature of a gas range is a virtue. In modern new houses, this is less a factor, though it does help in providing a small contribution to the necessary cost of heating the house. In the summer time, with open windows, this feature, in most cases, is of negligible importance either way.

However, in the cases where it is a factor, by proper fluing of the gas range, it can be made even a cleaner, cooler kitchen than an electric range will provide. By fluing, I do not mean the use of the old, unsightly and unpopular exposed flue pipe. It is possible, with very little change, to flue connect these modern "flush to the wall" ranges, as well as the more general types, by a concealed connection at the back of a range direct to a flue in the wall, without any unsightly overhead pipe.

Since it can be proven that the products of combustion of a gas range are absolutely harmless, one might properly ask, why should we even think of flue connection? While the above is true, as will be developed later, the products of combustion do contain some heat and odors, as well as greases and oils from the oven and broiler cooking operations, the same as will be produced from similar cooking on an electric range. When we discharge these in the kitchen, we are as bad as the electric range in providing the much sought after

CLEVELANDS Set a Fast Pace for the Pipeline Jobs - - - - - - -

Left
BABY
DIGGER
Model 95



Right
CLEVELAND
Model
110

With them you Get { MOST COMPLETED TRENCHER FOOTAGE AND MOST ACTUAL WORKING HOURS } *Per Shift*

If you would meet and beat estimates on your trenching jobs you must have machines that will deliver the maximum footage, under all soil conditions, and do the work with a minimum of delays and at lowest operating costs. The Cleveland Baby Digger Model 95 and the Cleveland Model 110 enable you to accomplish just these results.

Compact, fast, tough, powerful and with all dead weight eliminated they answer completely your requirements. Correctly designed and ruggedly constructed machines, they have the built-in qualifications to handle the gruelling main line work: extremely compact, flexible and easy to move around on the job they afford maximum machine-usage in the crowded conditions of cities and towns.

By unstintingly spending money on constructions "Cleveland" enables you to save time and money on every job. Write today for complete information.

THE CLEVELAND
TRENCHER COMPANY
"Pioneers of the Small Trencher"
20100 St. Clair Ave. Cleveland, Ohio

Easily transported on their own specially built trailers, at truck speed, Clevelands make machine trenching available on more jobs.

For
OIL
and
GAS

under High Pressure

You can handle pressures up to two thousand pounds under perfect control and pass on to your distributing lines whatever reduced pressure may be called for by use of the proper C-F Regulators. There are standard regulators for all pressures up to 600 pounds—for higher pressures designs are adapted to suit specifications. Ask for catalog.

The **CHAPLIN-FULTON MFG. CO.**
28-40 PENN AVE. CF PITTSBURGH, PA.

if
THERE'S ANY
DOUBT
IN YOUR MIND
about your

GAS PURIFICATION

ask Connelly. Every day more gas companies are finding Connelly's Complete Purification Service the money-saving answer to cost and performance problems. And don't be too sure *your* plant's purification costs can't be lowered By a searching analysis of requirements our Engineering Dept. has recommended changes resulting in direct savings up to 50% for gas companies. Over 65 years devoted to gas purification plus daily contact with problems all over the field make possible these remarkable savings.

HOW MUCH SHOULD PURIFICATION COST?

Send a sample of your used material and give us an idea of the required capacity. We will analyze and advise for further use or disposal, also tell you what your normal costs should be. Write Connelly, today!

CONNELLY IRON SPONGE & GOVERNOR CO.
Chicago, Ill. Elizabeth, N. J.

clean, cool, odorless kitchen, and yet we have in the products of combustion sufficient heat to create the necessary draft in a concealed flue to provide proper kitchen ventilation without the fan, which so many electric kitchens require.

When the fan is used, as in most electric kitchens, these vapors, greases and odors of cooking are discharged into the room, some of which cannot help but deposit soil and dirt, while the rest is caught in the fan and pushed out of doors. However, by flue connection, with a gas range, these vapors are caught at the source insuring clean walls and a cool, clean, odorless kitchen. In other words, we have potentially a cleaner, cooler, and more odorless kitchen to offer with gas than electric cooking provides, and yet this is the one point electric cooking has championed and sold to the public.

It may be argued that if a flue is so important, electric ranges could be flued to meet this need and therefore gas has no advantage. However, the reason they have not done so is because they do not have the warm products of combustion to create the necessary draft. Furthermore, to flue a broiler on an electric range involves complications, as a result of the condensation of greases and fats in the flue pipe and creates a fire hazard. Modern gas ranges are equipped so that these vapors must pass through the flame and are thereby incinerated to clean gases—carbon dioxide and water vapor, and therefore do not involve this difficulty.

There is no operation in cooking that is as productive of grease, dirt and odors in the kitchen as the broiling operation and yet broiled food is delicious. It is possible to broil a steak in a modern gas range and have absolutely no odor or smoke at the vent. In other words "flame cooking" is an advantage, rather than a liability which electric cooking advocates try to make us believe, since it is the only method that insures incineration of those greases and smokes which the broiling operation produces in such quantities. We should champion "flame cooking" as the means whereby we can produce a cleaner kitchen than their operations are capable of.

Again let us state that the primary purpose of the flue is to remove cooking odors, greases and oils from the broiling and roasting operations and not because of the nature of the products of combustion, as will be readily seen from the following:

The combustion products of gas are two odorless, clean, harmless gases, namely, carbon dioxide and water vapor. The combustion products from gas used for cooking in the average house amount to some 70 cu. ft. of water vapor per day or about 8 lbs. of water a day added to the air of a house, or about 1/6 the amount that health authorities tell us should be added to the air of the average house to improve it. There is also produced some 35 cu. ft. of carbon dioxide, which, assuming absolutely no air change, is 1/3 of 1% of the average small house, yet in inhalators used at hospitals to revive a person after an anaesthetic, a mixture of 7% CO_2 and oxygen is used. If we assume a normal infiltration of one air change an hour, this 1/3 of 1% becomes 1/76 of 1%. Again these points are insignificant to consider.

The grease, grime and dirt from cooking do not come from the fuel, either gas or electricity. It is the oils, fats and greases that are boiled, broiled and distilled from food in the cooking operation that cause dirty conditions. The higher the temperature used for cooking, the worse these conditions are.

One situation that had led the public to accept the myth of the cleanliness of electric cooking is because gas, with its ready and unlimited heat capacity, has accustomed people to high temperatures for cooking, which some people prefer.

However, electric cooking, by reason of its limitations, has had to champion low temperature cooking, which we must admit has numerous advantages. As a result, when a person goes from an old type gas range, and the use of high temperature for cooking to electric cooking, of course the resultant cleanliness is most impressive. However, the use of low temperature cooking is not limited to electric ranges, but can be used with equal success with gas if one wants to.

While even with low temperature cooking odors and greases are produced to a much lesser extent, so that fluing with either gas or electric cooking may not usually be necessary or desirable, nevertheless in cases where these factors are important, the vented gas range can produce a superior result.

From the above we can see that gas cooking is not only more economical and a generally superior method of cooking but it also is capable of excelling the biggest feature of electric cooking, namely, the development of the clean, cool, odorless kitchen, as outlined earlier in this paper. By such methods all the advantages of gas cooking can be maintained, together with excelling in all the advantages that electric cookery is supposed to provide.

Therefore, we can see that our cash position in gas cooking is indeed strong and that our bond issue is secure if we merely make use of our potentialities and develop them to the limit.

The above would seem to indicate that our budget was more than balanced and that we should have considerable of a surplus to use to improve our position. As you study this matter carefully, I think you will become convinced that few industries have so many favorable factors to work with. Now let us look at the record to consider the practical effect of some of these fundamentals to indicate whether we really have a surplus, as indicated by progress.

In this connection I was interested to read in the Bulletin of Standard Statistics the other day the following statement under a chart giving the statistics of the manufactured gas industry over the past ten years, bearing in mind that up until recently Standard Statistics has been rather pessimistic as to the future of manufactured gas.

"The Manufactured Gas Industry sees less variation in the sales of its product than almost any other major industry. Consumption over the past 10 years of prosperity and depression has run within a range of 10%."

Likewise it is interesting to note that, in the first house featured by "Life Magazine" in their recent activity of modern home construction, it had gas for the "4 big jobs," i. e.—cooking, water heating, refrigeration, and house heating. Also, in the Annual Architects Contest conducted by "House & Garden," the prize winners of which were just announced, it is interesting to note that three of the four big jobs in the prize winning house in Class II had gas for cooking, water heating and house heating.

These developments are really significant and again are tribute to the efforts of the various architects' and builders' promotional activities, so well conducted in these past few years by the A. G. A., in addition to their national advertising program. No more striking evidence as to the benefit of these activities could be offered, the seeds from which will live to benefit us tremendously in the years to come.

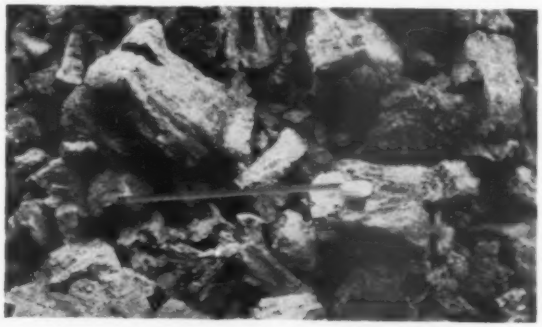
Another activity of the Gas Association of which we should be proud and do all we can to help along, and which can have a very far reaching effect, is that of the C.P. Range activity. It certainly has made

CURRAN-KNOWLES GAS AND COKE OVENS

Successfully carbonize Low Volatile, High Volatile, Swelling or Non-Swelling Coals.

Give a high yield of superior quality coke for water gas generator fuel, industrial and domestic use; a high yield of tar of excellent quality and a uniform quality of gas which meets Commission requirements.

Substantial construction. Low initial cost per M. capacity. Low operating cost due to simplicity of design.



Built to suit any situation. Over 5 years' successful operation.

Ask for bulletins showing plants and products.

COAL CARBONIZING CO.

Bank of Commerce Bldg. St. Louis, Mo.

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR

ALL MAKES — ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

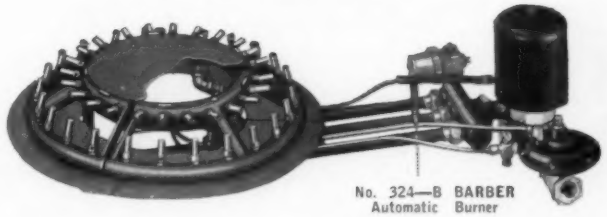
SAMPLES AND PRICES GLADLY SENT

— 0 —

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

Naturally, Dealers Prefer BARBER BURNERS —They Stay Sold!



No. 324—B BARBER Automatic Burner

A "half-baked" burner not only burns up the gas, but burns up the dealer. *Claims* for efficiency, and an actual 20-year *record* of efficiency, are two different things. Barber Burners have proved their superiority in installations running high into the thousands. Remember—your sales will often rise or fall by what one customer tells another. It's good business to bank on Barber—and build your *own* record of selling gas burner satisfaction!

The "B" Model shown comes in 8 sizes for round grates 12" to 34" in diameter. There is also a wide range of sizes for oblong grates. Both round and oblong conversion burners now adjustable at time of installation to fit combustion chamber. Patented BARBER Jets insure complete combustion with *highest flame temperature* on atmospheric pressure, and a "scrubbing" flame action on walls of firebox. No fire brick or refractory elements needed. Baltimore Safety Pilot. Listed in A. G. A. Directory of Approved Appliances. Ask for Catalog and Price List on Conversion Burners for Furnaces and Boilers, Burner Units for Gas Appliances, and Gas Pressure Regulators.

No. 104—B Barber Burner

THE BARBER GAS BURNER CO.

3704 Superior Ave. Cleveland, Ohio

Address Michigan Inquiries to

The Barber Gas Burner Company of Michigan

4475 Cass Ave., Detroit, Mich.

BARBER *Automatic* JET GAS BURNERS

for Warm Air Furnaces, Steam and Hot Water Boilers

and Numerous Other Heating Appliances

manufacturers, customers and the industry generally "gas cooking conscious." With such a theme to rally around, talk about, and advertise, it has the possibility of being the one single greatest influence in the successful future of our industry.

We must bear in mind that our cooking load, so vital to our future welfare has been facing a formidable set of circumstances. The average uses in the home for cooking and water heating would provide an electric market over 8 times that which the average home now uses. With the Government's hydro programs in need of markets to justify their existence and with large electrical manufacturing concerns ready and anxious to supply the equipment and facilities, we must be very alert to keep alive in the mind of the public the truth of the superiority of gas with its "flame fuels" for cooking. Huge propaganda programs have done a splendid selling job in trying to establish in the minds of "Mrs. American Housewife" the superiority of the electric kitchen. If I am any judge of things, our C.P. Range activity and our national advertising came on the scene just in the nick of time to save the day, and we should do all we can to help them "finish the job to the queen's taste."

In this connection, it is important that those of us who are in the operating end of the business do all that we can to train our service men so that these new features of the C.P. Range will receive proper installation and adjustment. If this is not done, then a large share of the advantages of the C.P. Range activity can be lost at a critical time in the birth of this new development. We have had a most favorable experience with some 350 C.P. Ranges equipped with electric ignition and it is in no small measure due to the care to which we went, to see to it that the service men assigned to these ranges knew what to do, and thoroughly understood the fundamentals involved, and had some training in electrical service problems. It is not as hard a task as you may think, but it is most important that these new devices on C.P. Ranges receive the type of servicing to which they are entitled, if we are to continue to prove to the customer that gas cookery is ideal and the best for her needs.

The gas industry is remarkably flexible, we can efficiently use almost any grade of low form value fuel, and can convert it into a clean gaseous fuel. Therefore, we have nothing to fear as to the part our industry will play in the future. Our methods and products from which we start may change, with the whims of the effect to which our complicated society is subjected, but the essential facts are that we can change with them, and our place in the sun is assured.

Is it any wonder that those who study the fundamentals of our industry are enthusiastic as to its future? As the years go on, and the stores of our irreplaceable fuels, such as oil, begin to cease their present flooded market condition, there is a tremendous market that will be driven to our doors in spite of us. However it is our duty to hasten, not retard, this day. With the known oil reserves of the country only able to supply present uses in the neighborhood of 12 years, it is easy to see that in a few years our industry will be destined to a tremendous rate of development.

Is there an industry that a young man could find to better fit himself to follow? While unsound and unwise economic development may retard the speed with which this condition comes, it cannot stop it.

Therefore I think you will agree with me that the economic budget of our industry not only is balanced but causes a substantial surplus that can move in but one direction, namely, forward. Let's not just ride with it, but let us put our shoulder to the wheel and help it along.

Advertising Contest Awards Announced

Winners in the nationwide contest conducted by the Association of Gas Appliance and Equipment Manufacturers awarding prizes to advertising managers of gas utilities and combination companies, whose local advertising activities best tied-in with the American Gas Association's 1938 national advertising campaign, were announced March 10th by F. E. Sellman, chairman of the contest committee, as follows:

The judges and contest committee chairman in the advertising competition are shown here viewing the entry of the national winner, W. R. Squier. Those in the picture, left to right, are (seated) F. E. Sellman, Henry Obermeyer, Earl Pearson, and (standing) Raymond C. Mayer.

First Prize: $200—W. R. Squier, advertising manager of the Washington (D. C.) Gas Light Co.; Second Prize: $100—R. T. Ratliffe, advertising manager of the Kansas City (Mo.) Gas Co.; Third Prize: $100—Jay C. Barnes, advertising manager of New Orleans (La.) Public Service, Inc.; Fourth Prize: $100—Gerald A. Higgins, advertising manager of the Boston (Mass.) Consolidated Gas Co.; Fifth Prize: $50—J. Lyman Gollegly, advertising manager of the Central New York Power Corp., Syracuse, N. Y.; Sixth Prize: $50—Robert Kanze, advertising manager of the Illinois-Iowa Power Co., East St. Louis, Ill.; Seventh Prize: $50—Henry Lawson, advertising manager of the Springfield (Mass.) Gas Light Co., and Eighth Prize: $50—Dale Remington, advertising manager of the Wisconsin Public Service Corp., Green Bay, Wisconsin.

GPM IRON HYDROXIDE
← LOWEST COST
→ PER POUND OF
SULPHUR REMOVED
GAS PURIFYING MATERIALS COMPANY INC., L. I. CITY AND PROVIDENCE

$400,000.00
in
FIVE YEARS

Just one job of load-building with the

Republic Lo-Bill
CONVERSION WATER HEATER

AUTOGAS CORPORATION
Chicago, Illinois

GENERAL SALES AGENT
Republic Heaters Sales Company
2258 Diversey Ave. Chicago

TITAN WATER HEATER CONTROLS

AGA Approved TITAN Temperature and Pressure Relief Valve

This device is installed on the hot water outlet in the tank directly in the flow of water. Action, as a result, is unfailing and positive, there being no dead pockets to prevent proper functioning of relief valve.

Pressure relief is obtained through a spring-loaded valve which opens when the pressure reaches a predetermined point. Should the water become overheated to 200° F, a fusible disc melts and lets the water escape thereby preventing a further increase in temperature.

The Titan Relief Valve serves as a coupling connected in the line thereby eliminating the necessity and expense of a tee fitting. To replace fusible disc, it is not necessary to disassemble valves or piping in any way.

Designed for application to storage or range boilers. Prevents corrosion, scalding and explosion.

Catalog and full information upon request.

The Titan Valve & Manufacturing Company

Thermostats • Safety Pilots • Relief Valves • Safetystats
9913 Elk Avenue Cleveland, Ohio

FOLKS LIKE YOU

You'll like the other guests at the Bismarck. They, too, enjoy and appreciate good food, unobtrusive service and restful rooms.

IN THE HEART OF CHICAGO

BISMARCK
HOTEL-CHICAGO
RANDOLPH AND LA SALLE

CRUSE-KEMPER COMPANY
STEEL PLATE CONSTRUCTION

AMBLER, PA.

GAS HOLDERS
HOLDER INSPECTION

RIVETED OR WELDED FABRICATION & ERECTION
TANKS, BINS, FLUES PURIFIERS, WELDINGS

L.T.P. 103
Temperature & Pressure Relief Valve

LIMITS THE TEMPERATURE AS WELL AS THE PRESSURE . . .

Gives positive emergency relief!

This **double protection** is required on every domestic water heater . . . Temperature plus pressure relief, **never one without the other,** is a principle proven by exhaustive study, years of research under both test and practical service conditions.

And, on this principle are engineered the entire Kitson line of Automatic Devices made under Lovekin patents! If you're not now using them, be sure to send for free literature based on thorough investigation of the subject of thermal control. No obligation; just write—

KITSON COMPANY
2409-15 Westmoreland St., Philadelphia, Pa.

Manufacturers of: Kitson Safety Devices (Lovekin Patents) for Domestic Water Heaters . . . Quality Brass Goods for Gas, Water and All Plumbing Uses.

Carbonizing Properties of Sub-bituminous Coal From Puritan Mine, Dacono, Weld County, Colo.[1]

By J. D. Davis[2] and V. F. Parry[3]

A sample of sub-bituminous coal from Colorado was carbonized in the BM-AGA apparatus at the Pittsburgh Experiment Station. The yield and quality of the products were determined when carbonized at temperatures of 500°, 600°, 700°, 800°, and 900° C. Subsequent tests were made on the properties of the chars obtained from these experiments, including measurements of fixed gases obtained when heated to successively higher temperatures, contraction of the chars as related to temperature of heating, the amount of degradation of the char when reheated, and data on the proximate and ultimate analysis of the chars produced under various conditions. Two experiments on heating sized coal were completed, and data were obtained on the degradation of the lumps when heated to 550° C.

The experimental data obtained on this typical sub-bituminous coal support the following general conclusions:

1. When this coal is carbonized at low temperatures in the BM-AGA retort the yields of products at 500° and 600° C. are as follows:

	500° C.	600° C.
Coke yield .....per cent	56.7	51.8
Tar ..... " "	4.1	3.2
Light oil ..... " "	.23	.43
Water ..... " "	30.3	29.1
Gas ..... " "	6.2	12.5
Gas .....B.t.u. per pound	810	1490

The above yields are consistent with yields anticipated from the proximate analysis.

2. When this coal is carbonized at temperatures higher than 600° C. in the BM-AGA retort the high concentration of water in the products of distillation promotes the water gas reaction which increases rapidly with the temperature. The extent of this reaction at 900° C. has been calculated from the experimental data and found to amount to approximately half the volume of the gas produced and 35 per cent of the potential heat in the gas. Because of the extent of the water gas reaction and the absence of coke formation it is questionable whether the Standard BM-AGA test is a fair commercial assay for noncoking high-oxygen coals.

3. The chars or residue shrink 30 to 45 per cent as a result of carbonization. The residue from carbonization at 500° C. contains about 14 per cent volatile matter, which is converted to a gas rich in hydrogen when heated to higher temperatures. If the char is heated to 900° C., 8,800 cubic feet of gas is formed per ton of char and this gas contains 66 per cent free hydrogen.

4. The coal is absolutely noncoking and disintegrates considerably when carbonized. Approximately measures, obtained by screen analysis, indicate a degradation of 25 per cent when heated to 550° C., and the amount of degradation increases with temperature.

5. Data are shown that predict the yields from a sub-bituminous coal when carbonized in a continuous retort at various temperatures. In such a system the primary products of distillation are removed from the retort before excessive secondary reactions can occur.

[1] *Reprinted from Bureau of Mines Report of Investigations 3428.*
[2] *Senior fuels chemist, Central Experiment Station, Bureau of Mines, Pittsburgh, Pa.*
[3] *Senior fuel technologist, Bureau of Mines Field Station, Golden, Colo.*

FOR COKE STRUCTURE, GAS YIELD OR BALANCED PRODUCTION IN RETORT, BY-PRODUCT OR WATER GAS PLANTS

champion Gas COAL

Whether you want better coke structure, a higher gas yield or a compromise between the two for production balance, there is a Champion Coal of proven merit for any one of these purposes, assuring you the one best type of coal for your particular plant needs. It will pay you to investigate the advantages of Champion.

PITTSBURGH COAL CO
CHAMPION COAL
PITTSBURGH, PA

PITTSBURGH COAL COMPANY
General Sales Offices: Henry W. Oliver Bldg., Pittsburgh, Pa.
Baltimore, Md., Cleveland, Ohio, Pittsburgh, Pa., Boston, Mass., Detroit, Mich., Sault Ste. Marie, Mich., Buffalo, N. Y., Erie, Pa., Utica, N. Y. New York City, Philadelphia, Pa., Youngstown, Ohio.

PITTSBURGH COAL COMPANY of Wisconsin, Duluth, Superior, Minneapolis, St. Paul
MILWAUKEE WESTERN FUEL COMPANY, Milwaukee, Wisconsin

The Dealers' Position in Gas Range Sales

By
J. H. Taylor
General Sales Department,
B. C. Electric Railway Company, Limited,
Vancouver, B. C.

IT is now the confirmed conviction of many gas company sales executives that the only proper way to maintain present and add increased domestic gas range load is for the gas utility not to go the limit alone, but to take the stove and major appliance dealers into their confidence and encourage all of these dealers to display and sell gas ranges.

This change of thought and of action has come about during the last few years after seeing the remarkable strides made by electric utilities in sponsoring sound dealer relations programs.

My Company happens to be one of those "Roman Riders," as we distribute both gas and electricity in Vancouver and surrounding districts. For many years our own merchandise department sold practically 100% of all gas ranges placed in the territory. Three years ago we started a Dealer Cooperative Plan whereby dealers were able to offer the same concessions to their customers as the customers would receive if they purchased direct from the B. C. Electric Railway Company, Limited.

We have over 30,000 customers using gas ranges, and a test survey taken three years ago indicated that more than 75% of these customers were using old style comparatively inefficient ranges without insulated oven and without heat control. The inauguration of the Dealer Cooperative Plan is rapidly changing this picture as the dealers have been educated to display and sell the higher priced fully modern gas ranges now available. This change was not made overnight. In fact, even now many of the range dealers who handle all types of ranges have not reached the point where they suggest to the customer a gas or electric range in place of a coal, wood, oil or sawdust model. This is a situation that the dealer contact representatives are altering by education of the dealer and his salesmen in the selling of gas and electric ranges.

The competitive fuel situation in this area where wood is cheap, and sawdust is also used quite extensively for kitchen ranges, was the principal factor that made us place the following concessions in effect.

1. Free installation for customers on straight gas ranges or on gas and coal combination ranges, providing gas is one of the oven fuels. This installation applies to new ranges purchased either through the Utility Company direct or from any regular retail dealer. This Company either handles the installation itself or pays the dealer his cost for putting in the range.

2. An advertising bonus of $5.00 is paid to the dealer for each straight gas range he sells direct; and a similar bonus of $2.50 is paid in the event the dealer sells a combination coal and gas range, having gas as one of the oven fuels.

The pasters on this dealer's store window read "Gas Ranges Installed Free."

3. Any retail dealer can offer his prospect a $15.00 trade in allowance for his old gas range that has been in use for longer than a year, in the event a new gas range listed at $100.00 or over in value is purchased. The Utility Company in turn pays the dealer this allowance when he sends the old range to the Utility Company's warehouse. The allowance on the old range is $10.00 where a new range listed at less than $100.00 or a combination coal and gas range is sold.

These concessions coupled with aggressive promotion by the Company on the modern gas range have brought about a complete change, and we now find the dealers selling close to 50% of all gas ranges installed in the territory. Figures for the last two years were—

GAS RANGE SALES—
VANCOUVER AND VICINITY

	Dealers' Sales	Direct Co. Sales	Total
1937	491	776	1267
1938	630	707	1337

We now have 46 dealers' stores in the territory which display gas ranges compared with not more than 5 dealers less than five years ago.

During the last two years a consistent advertising plan has been built up to impress our customers with the fact that gas ranges are modern; and this theme is used in all Company gas range advertising, and in articles on gas ranges that appear in the Company publication "Home Service News" sent monthly to each customer.

Sales promotion material in the form of window banners and pennants are provided. Gas range poster boards carry the signature "B. C. Electric or your Dealer."

In Canada we have not so far been able to use the story of the CP Range, as hardly any of the Canadian models have been submitted for approval. This condition is changing to some extent. We know the mass effect of CP Range advertising on the part of the American Gas Association and of the manufacturers, which appears in United States magazines, has kindled a re-awakened interest on the part of customers in the gas range. Many of these magazines have large circulations in Canada.

A fair dealer relation plan places dealers in a position where they have every reason to display and sell gas ranges on an equal basis with other merchandise.

The dealers' position in gas range sales is one that requires serious study on the part of all sales executives. In our own Company we feel that only a start has been made in sponsoring a greater volume of gas range sales through the assistance of the dealers, and that a steadily increasing volume of dealer sales will be made as a result of our Dealer Cooperative Program.

An Analysis of Three Types of House Insulation

By
J. R. von Sternberg

WITH the development of modern insulating and heat-stopping materials over the last fifteen years has come a confusion of terms and claims that leaves the average home owner, builder and building manager bewildered and asking, "What kind of insulation—storm sash, weatherstripping or wall and roof insulation—will do the most for my house?"

Unfortunately, no general rules apply to all cases. To calculate exhaustively the heat losses from any one insulated building, estimating the cost of material and labor and the probable value of the fuel savings effected, will not solve the insulation problems of all houses. For everyone appreciates that a house in northern Minnesota has a far different insulation problem than one in Jacksonville, Florida. There may also be a considerable difference between two houses on the same street, due to differences in exposure, construction and room arrangement.

Nor can insulation's benefits be fairly compared on a first cost and return basis, although the cost of any building product will naturally be a factor in its use. Obviously, a man who spends $15 for a suit pays a heap sight less than the man who spends $50, and still the cheaper suit may prove to be the poorer bargain.

Insulation, besides reducing fuel costs in winter, however, is designed to improve comfort. Thus the first judge of insulation should be comfort. In winter, maximum comfort means maximum protection against loss of heat. In summer, maximum comfort means maximum protection against outdoor heat. These two objectives, then, winter and summer comfort, provide a fair basis of comparison of all insulating and heat-stopping materials.

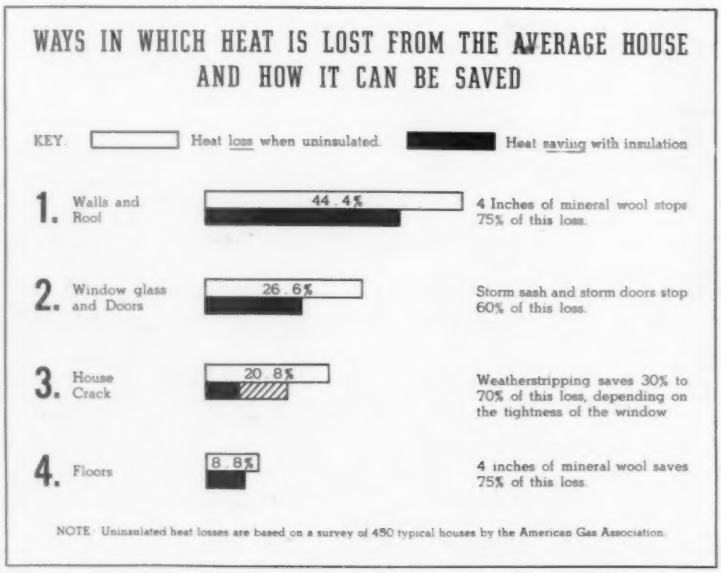
But of the three types of insulation—storm sash, weatherstripping and wall and roof insulation—only wall and roof insulation provides any summer protection. Let us then consider the winter protection that each provides:

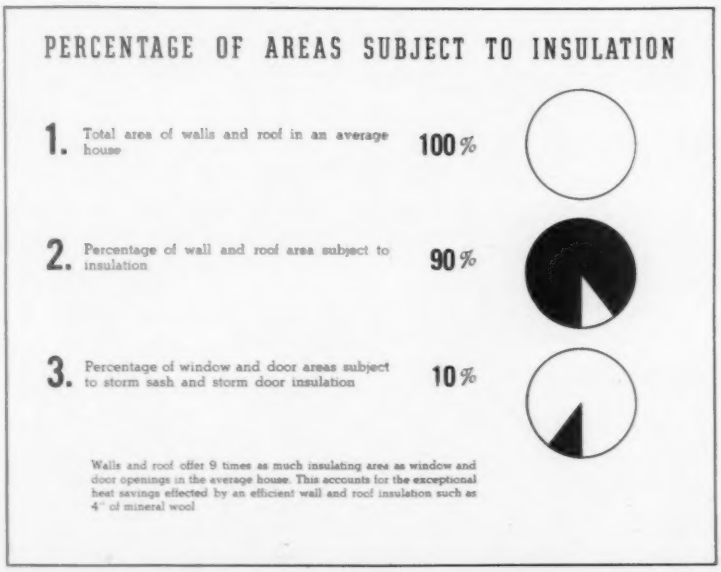
In winter, a house will lose its heat in several ways: through its openings, such as windows and doors, and through its walls, floor and roof.

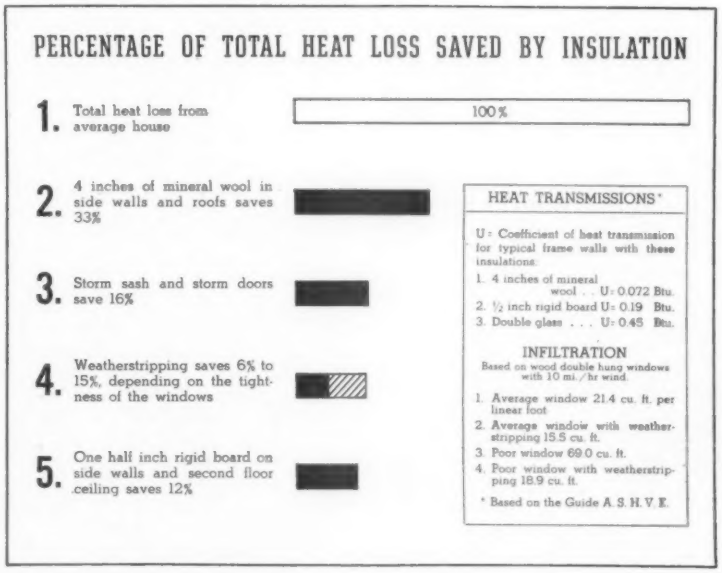
Weatherstripping, storm sash and double-glazing prevent loss of heat through openings, while insulation prevents heat loss through walls, floor and roof. Occasionally, both window and wall insulation are desirable, while at other times, only wall insulation is thermally practical. Following is a brief discussion of the relative effectiveness of these different materials:

Weatherstripping is a window seal. All windows leak cold air into a house around the sash and around the frame where it joins the wall. Weatherstripping will help seal the sash of the window, and caulking will help seal the frame.

The Guide of the American Society of Heating and Ventilating Engineers shows that poor windows,


WAYS IN WHICH HEAT IS LOST FROM THE AVERAGE HOUSE AND HOW IT CAN BE SAVED
KEY
Heat loss when uninsulated
Heat saving with insulation
1. Walls and Roof
44.4%
4 Inches of mineral wool stops 75% of this loss.
2. Window glass and Doors
26.6%
Storm sash and storm doors stop 60% of this loss.
3. House Crack
20.8%
Weatherstripping saves 30% to 70% of this loss, depending on the tightness of the window
4. Floors
8.8%
4 inches of mineral wool saves 75% of this loss.
NOTE Uninsulated heat losses are based on a survey of 450 typical houses by the American Gas Association.


PERCENTAGE OF AREAS SUBJECT TO INSULATION
1. Total area of walls and roof in an average house
100%
2. Percentage of wall and roof area subject to insulation
90%
3. Percentage of window and door areas subject to storm sash and storm door insulation
10%
Walls and roof offer 9 times as much insulating area as window and door openings in the average house. This accounts for the exceptional heat savings effected by an efficient wall and roof insulation such as 4" of mineral wool


PERCENTAGE OF TOTAL HEAT LOSS SAVED BY INSULATION
1. Total heat loss from average house
100%
2. 4 inches of mineral wool in side walls and roofs saves 33%
3. Storm sash and storm doors save 16%
4. Weatherstripping saves 6% to 15%, depending on the tightness of the windows
5. One half inch rigid board on side walls and second floor ceiling saves 12%
HEAT TRANSMISSIONS*
U = Coefficient of heat transmission for typical frame walls with these insulations:
1. 4 inches of mineral wool . . U = 0.072 Btu.
2. ½ inch rigid board U = 0.19 Btu.
3. Double glass . . . U = 0.45 Btu.
INFILTRATION
Based on wood double hung windows with 10 mi./hr wind.
1. Average window 21.4 cu. ft. per linear foot
2. Average window with weatherstripping 15.5 cu. ft.
3. Poor window 69.0 cu. ft.
4. Poor window with weatherstripping 18.9 cu. ft.
* Based on the Guide A. S. H. V. E.

when weatherstripped, will admit about 10 per cent less cold air than well-fitted, or average windows not weatherstripped. Weatherstripping a tightly-fitted window will reduce its infiltration by about 30 per cent.

Storm windows and double-glazed windows are also good heat-stops. The addition of an extra thickness of glass provided by storm sash, reduces the heat lost through the glass by about 60 per cent. Storm sash, when applied over poor, or loose-fitting windows, also provide some weatherstripping action. When windows are very loose, this reduction may be as much as 50 per cent of the infiltration.

But when storm sash are applied to average fitted windows, the Guide shows, very little reduction in infiltration is secured.

Windows in the average house, however, occupy only about 10 per cent of the total wall area. Reducing this heat loss does not reduce the substantial heat loss through the walls, floor and roof of the house. This loss, quite naturally, can be effectively reduced only by means of wall and roof insulation.

It can be seen, then, that in order to estimate the relative effectiveness of each of these types, it is necessary to know what share of the total heat loss is saved by each.

In an effort to indicate this relationship, the American Gas Association conducted a survey of heat losses from 450 typical houses and arrived at the following average heat losses:

1. Loss through walls and roof, 44.4 per cent. 2. Through floors, 8.8 per cent. 3. Through cracks, 20.8 per cent, and 4. Through glass and doors, 26 per cent.

These figures represent only average losses. While they may not apply to every house, most houses, on the other hand, will lose their heat in the given proportions, no matter where they are located in the heating belt.

Taking these averages, and calculating the percentage of each saved by its respective insulation, using the rated efficiencies as given in the Guide of the A.S.H.V.E., we find that the following materials will give maximum protection against each of the four heat losses listed by the American Gas Association.

1. Four inches of mineral wool in side walls and second floor ceiling will effectively reduce the loss through walls and ceiling by about 75 per cent, or the total loss by 33 per cent.

2. Weatherstripping of windows and doors will reduce heat loss through window and door crack by 30 to 70 per cent, or 6 to 15 per cent of the total heat loss, depending on how well built the window is.

3. Storm sash and double-glazed windows will reduce the heat loss through average windows by about 60 per cent, which represents 16 per cent of the total heat loss.

4. Four inches of mineral wool installed in lower floors will reduce the heat loss through them by 75 per cent, or the total heat loss by 6.6 per cent.

These figures may serve as a general guide to the home owner planning to install one or more heat stops in his home. His final judgment should be weighed, however, by not only these percentages, but by reference to the state and exposure of his house. In this way, he may determine his precise insulating needs.

HAYS *Threadless* GAS STOPS

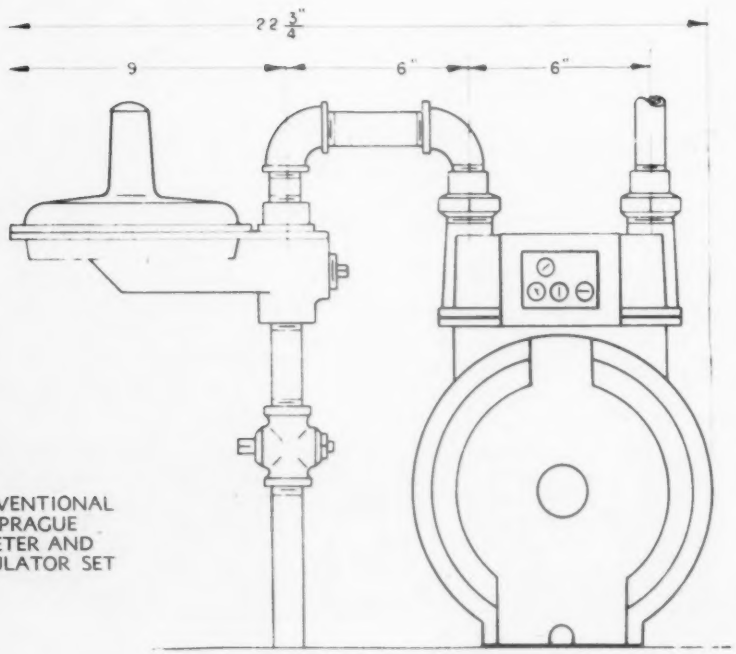
HAYS FLAT HEAD
BLACK IRON BODY
BRASS PLUG STOPS
With Dresser Super Service Couplings
PLAIN RUBBER MOLDED GASKET OR ARMORED GASKET
HEAVY CAST IRON WALLS THROUGHOUT.
FORGED STEEL COUPLING NUT.
GASKET RETAINER CUP KEEPS THE GASKET FROM CRAWLING OUT.
CLEARANCE TO ALLOW FOR PIPE DEFLECTION.
MANUFACTURED UNDER LICENSE WITH DRESSER MFG. CO.
MADE IN 4 SIZES
1", 1¼", 1¼" x 1", 1½"
Consult us for other sizes.

Hays now provides a threadless method of hooking-up service pipe. Elimination of threaded pipe ends adds 40% to the strength of pipe in the joint. An outstanding feature is the ease of assembly under any conditions. The pipe is in constant seal but floats in the joint to permit flexing due to vibration or ground pressure. Large pack surface of gasket assures tight connection even with corroded or deflected pipe. Write for data.

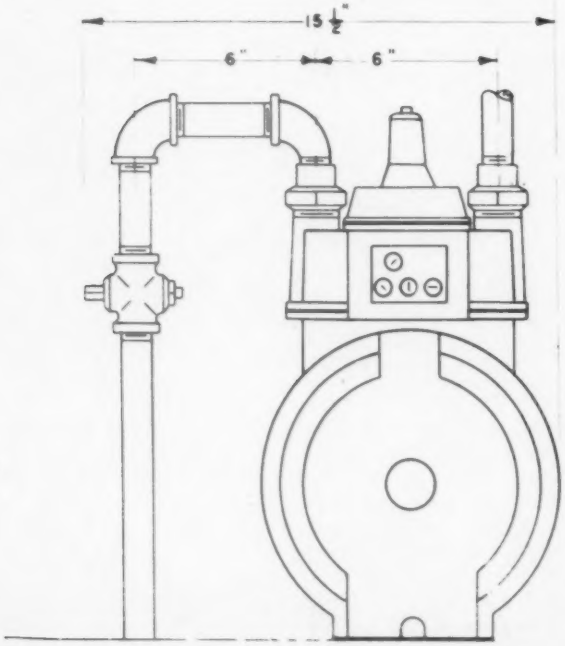
HAYS MFG. CO., ERIE, PA.

The Combination Meter and Pressure Regulator

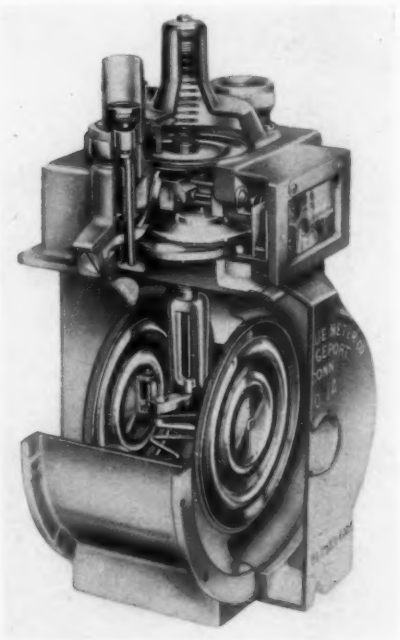
By
W. P. Hutchinson
President
The Sprague Meter Company



CONVENTIONAL SPRAGUE METER AND REGULATOR SET



SPRAGUE'S COMBINATION METER AND REGULATOR SET



A CUSTOMER'S meter and gas pressure regulator, assembled as a single self-contained unit, has recently been perfected and put on the market by the Sprague Meter Company of Bridgeport, Conn.

The close relationship of pressure control and the measurement of gas has led many to the belief that there would be distinct advantages in having both of these functions performed in a single unit. Several years of study and research have resulted in a practical device for handling both of these operations, and this device takes up virtually no more space than a conventional low pressure meter installation of like capacity. Incorporation of the regulator into the meter top has resulted in an increase of only two and a half pounds in the weight.

The combination meter and regulator consists merely of a conventional Sprague iron case meter, in the top of which is set a spring loaded pressure regulator. All of this is shown in the sectional view cut on this page.

The gas enters through the regulator and is discharged into the top chamber of the meter case, from whence it passes through the inlet valves, and after measurement, is discharged through the meter outlet in the conventional manner.

The maintenance cost of the regulator is low as there are only four moving parts. Simplicity of design makes it possible to assemble the whole pressure regulating portion in three minutes, and it may be detached and replaced by an entirely new reg-

ulating mechanism if this should become necessary.

Convenient and rapid inspection of the valve assembly is provided. It is necessary merely to disconnect the meter inlet connection ring and the valve plunger may then be removed for replacement of the regulator valve disc.

When converting a low pressure distribution system to medium or high pressure by the use of combination meter and regulator units, it is only necessary to change the meters. No rearrangement of the piping or installation of extra fittings is required. Considerable labor and material are thus saved.

Regardless of the proximity of foundation walls, combination meter and regulator units can be installed. No unit connections are necessary on the high pressure service pipe. Also, since the regulator is an integral part of the meter a saving of 30 per cent in space is effected.

Such units should materially simplify the keeping of regulator records. The meter number serves as an identification for the complete unit, thus permitting records to be kept of the regulator as well as the meter at very little additional cost. Inspection and servicing becomes automatic with the periodic change of the meter, thereby reducing the hazard from leaky diaphragms and dirty valve discs.

Units of this type may be supplied with mercury seals and such seals are recommended for line pressures of over 60 pounds. The seals are provided with secondary gathering chambers of ample size to recover the mercury and allow it to return to the well after venting. Thus, upon completion of the blow, the flow of gas is sealed at a point close to its initial setting.

Ounces of mercury to seal the regulator:

1 oz. of mercury seals to 7½ W.C.

1½ oz. of mercury seals to 11" W.C.

2 oz. of mercury seals to 13½ W.C.

Testing, Proving and Adjustment of 1A Combination Meter and Regulator

The combination meter and regulator is assembled and tested in nearly the same manner as the regular meter with the exception of the additional parts being installed in the top casting at various stages of the assembling and testing. The center bracket assembly, valve seat gasket, valve seat, crank and valve cover are installed in the center casting in the usual manner. The fulcrum arm plug, valve plunger guide, and top bracket are installed in the combination top casting before it is placed on the center casting. The balance of the small parts and the cover casting are left off the meter until after further routine tests are made.

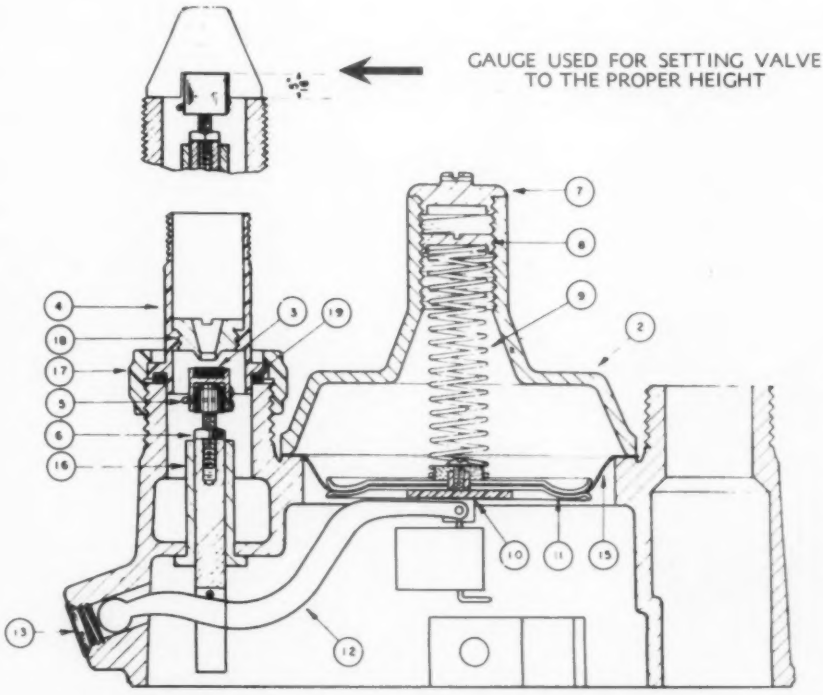
The assembly of the diaphragms complete, front and back castings are made in the usual manner after which the meter has heat applied to the flanges and the case screws tightened. A steel plate with a gasket cemented to the underside of the plate, is attached to the combination top by means of the regular screws in place of the cover casting. Now the meter is ready to be tested in a tank of water for any leaks that may be in the castings.

After the meter passes the tank test, the steel plate is removed. The fulcrum arm, fulcrum arm plate, pin, diaphragm tins, diaphragm leather, cap and screw are assembled as a unit, and then this assembly is installed in the combination top. The cover casting is put on the top and screwed tight to prevent leakage.

The meter is low-light tested in the usual manner to be sure the meter will register a very small flow.

The meter is proven in the regular manner—temperature, humidity and the other factors being given the usual consideration which is customary in the respective meter shops.

After the meter has been proven,



SECTION OF IMPROVED ASSEMBLED REGULATOR

LIST OF PARTS

NO 1 - REGULATOR CASTING	NO. 10 - DIAPHRAGM AND DISC PIN ASSEMBLY
NO 2 - DIAPHRAGM DOME	NO 11 - DIAPHRAGM PLATE (USE TWO)
NO 3 - VALVE DISC	NO. 12 - FULCRUM ARM
NO 4 - VALVE CONNECTION	NO. 13 - FULCRUM ARM BEARING
NO 5 - VALVE DISC HOLDER	NO. 14 - VENT CAP
NO 6 - VALVE GUIDE PLUNGER	NO 15 - DIAPHRAGM
NO 7 - CAP FOR DOME	NO 16 - VALVE PLUNGER GUIDE
NO 8 - SPRING ADJUSTMENT	NO 17 - STANDARD METER RING
NO 9 - REGULATOR SPRING	NO. 18 - IMPROVED STANDARD ORIFICE
	NO 19 - GASKET FOR METER CONNECTION

SPECIFICATIONS

CENTER TO CENTER OF CONNECTORS	6"
HEIGHT, TO HUB FLANGE	13-1/2"
" TO TOP OF REGULATOR	18-1/4"
THICKNESS, FRONT TO BACK	7-7/8"
WIDTH	9-7/16"
PROVING HEAD	2 CU FT
TEETH IN TOP BRACKET	15
CUBIC FEET PER REVOLUTION	133
CAPACITY, CUBIC FEET 1/2" W.C DROP	@ 162
" " 1" W.C DROP	@ 223
" " " 1-7/10" OR 1 OZ DROP	@ 292
WEIGHT OF UNIT (METER AND REGULATOR)	32-1/4 LBS

@ SPECIFIC GRAVITY OF GAS .70 AT 60° F 30" OF MERCURY

Summary of Tests on Combination Meter and Regulator (Regulator Only)

Rates on Natural Gas Sp. Gr. .700—60 F. (Summary of 382 Separate Tests)

Inlet Pressure	⅛" Orifice				3/16" Orifice				½" Orifice			
	Lock-up	3 ft/hr	200 ft/hr	Spread	Lock-up	3 ft/hr	200 ft/hr	Spread	Lock-up	3 ft/hr	200 ft/hr	Spread
150 Lbs.	10.4	10.0	9.60	.80	11.85	11.30	11.20	.65				
125 Lbs.	9.9	9.6	9.20	.70	11.25	10.55	10.50	.75				
100 Lbs.	9.4	9.0	8.70	.70	10.50	10.00	9.80	.70				
90 Lbs.	8.9	8.5	8.15	.75	10.25	9.75	9.55	.70				
80 Lbs.	8.8	8.4	7.95	.85	10.00	9.50	9.30	.70				
70 Lbs.	8.5	8.1	7.75	.75	9.75	9.25	9.05	.70				
60 Lbs.	8.3	7.9	7.55	.75	9.50	8.75	8.65	.85				
50 Lbs.	8.2	7.7	7.35	.85	9.30	8.55	8.45	.85				
40 Lbs.	8.0	7.6	7.15	.85	8.80	8.20	7.90	.80				
30 Lbs.	7.8	7.3	6.90	.90	8.50	8.00	7.55	.95				
20 Lbs.	7.5	7.1	6.55	.95	8.00	7.55	7.25	.75				
10 Lbs.	7.4	*7.0	6.20	1.20	7.70	*7.10	6.70	1.00	7.60	7.20	6.70	.90
5 Lbs.	7.0	6.7	5.80	1.20	7.40	6.90	6.35	1.10	7.30	*7.00	6.50	.80
4 Lbs.					7.35	6.85	6.30	1.05	7.20	6.90	6.40	.80
3 Lbs.					7.35	6.85	6.30	1.05	7.00	6.70	6.20	.80
2 Lbs.					7.30	6.80	6.25	1.05	6.80	6.50	5.90	.90
1 Lb.					7.20	6.70	5.90	1.30	6.60	6.40	5.50	1.10
½ Lb.									6.30	6.20	4.80	1.50
	* Regulator set at 3' P/H and 7" W.C.—Inlet pressure 10 lbs.				* Regulator set at 3' P/H and 7" W.C.—Inlet pressure 10 lbs.				* Regulator set at 3' P/H and 7" W.C.—Inlet pressure 5 lbs.			

July 15, 1938.

the valve plunger assembly, swivel with orifice installed, connection nut, adjustment spring, and adjustment screw are installed in the combination top and cover castings.

An adjustment screw and lock nut, which carries the valve cap, is provided at the top of the valve plunger to obtain the desired lock-up adjustment. The adjustment spring may or may not be used in setting the valve cap adjustment to obtain the lock-up adjustment.

The valve cap adjustment on the valve plunger should be so adjusted that when the meter and regulator is in normal operation the adjustment screw should not be less than one inch below the top of the top cover casting so that the adjustment spring will be in its most effective position and working range.

The adjustment for the outlet pressure is similar to the adjustment of any spring type regulator. To obtain a higher outlet pressure, the adjustment screw must be screwed down; if a lower outlet pressure is desired, the tension on the adjustment spring must be decreased. A pounds' pressure gauge may be used with a pressure tap connection ahead of the swivel which carries the removable orifice. Any convenient means of making a pressure tap connection at the outlet of the meter may be used to obtain the outlet pressure reading of the meter which pressure is in inches water column.

Now the adjustment screw cap is put on the cover, a cork plug placed in the vent, connection nut, washer and tin put on the outlet hub and a tin cap screwed on the inlet swivel which carries the orifice.

Gas Triumphant

(Continued from page 15)

Models of the same home incorporating a garage in the design, and also arranged in two stories for a smaller plot, will be on display.

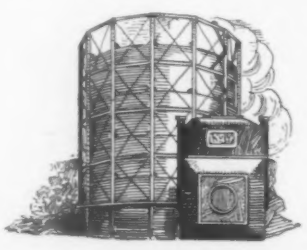
The collaborating architects were Dwight James Baum, architectural consultant for Good Housekeeping, and Skidmore and Owings, John Moss Associate, architects for the gas industry's gas exhibit group.

Landscaping

The landscaping of the "Court of Flame" buildings will be as colorful as the exhibit itself. Dramatic effects will be achieved through the contrast of holly and American white birch.

Michael Rapuano, New York landscape architect, to whom the task of designing a beautiful natural setting was entrusted, selected the sturdy spreading holly with its dark green leaves and the slender white birch with its light green foliage as affording the best and most enduring contrast for a setting that must be as lovely in November as it was in May. The countryside was combed for unusually excellent specimens.

Attention will be drawn to the majestic twin holly trees which stand out from all the other trees. Over two hundred years old, these two have a height of nearly 40 feet and a branch spread of more than twenty feet. It is estimated that each tree bears three tons of berries each year.



Benefits to be Reaped

Thus Gas joins the march into the "World of Tomorrow" primed to reap maximum dividends from an outstanding investment: the New York World's Fair. . . .

It is not surprising, then, that Grover A. Whalen, chief executive of the Fair, and his staff of technicians, designers and administrators, have been loud in their praise of gas, its efficiency and its adaptability. Nor is it surprising that they believe the spectacular use of gas at the Fair may open up entirely new uses for gas fuel as this country moves forward into "tomorrow."

As the gates of this great exposition swing open, millions of Americans will view the proof and the promise of gas. They will be given indisputable evidence that gas is the essential fuel of today, and tomorrow.

News of the Industry

New Natural Gas Line to Supply Houston, Texas

The accompanying photographs show work on the new 16" gas line of United Gas Pipe Line Company from Katy, Texas, to tie-in with the Goodrich-Houston main line. The following data is of interest in this connection.

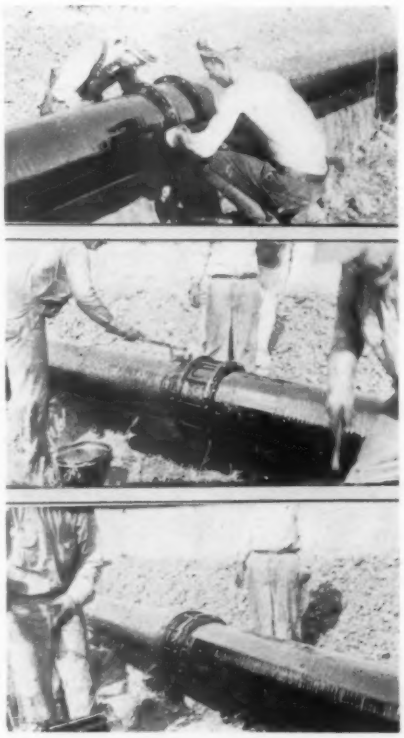
Total length of pipe-line: 3 miles of 8" (lateral); 18 miles of 10" 11 miles of 12"; and 14 miles of 16". Completed in November 1938.

Average working pressure: 350 lb. per sq. in., Maximum working pressure: 475 lbs. per sq. in.

Type of joints: Composite construction (both welded and Dresser Couplings) on the 16" size; welded joints used for the 8", 10", and 12" sizes.

Coating: Line coated with Barrett's enamel. Couplings enameled and covered with a paper known as Hexmesh, manufactured by Angier Corp., Framingham, Mass. It is pasted to coupling and pipe with Barrett's coupling compound. This paper is not filled with enamel or dope.

Number of Dresser Couplings used: 448—16" OD Couplings, Style 38, with Armored gaskets, plus a quantity of 147 extra gaskets, and 697 extra bolts for an additional 70 couplings. Armored gaskets were supplied with buffed armors to provide cathodic protection of the line.



Gas Fuel Dominates the Famous Country Club District of Kansas City

One of the largest and perhaps the most talked about real estate developments today in the United States is the famous Country Club District of Kansas City, the work of the J. C. Nichols Companies. As a residential development, the Country Club District is distinguished not alone for its size but for the high standard it has set in beauty and in scientific land development, and its methods for creating and promoting property values. It is distinguished in another highly important respect, namely, the widespread use of gas and gas appliances.

Beginning modestly in 1907 with a ten-acre tract, the Country Club District has now grown to 4,000 acres in Kansas City, Mo., and in an adjoining area across the state line in Kansas. The Kansas areas included, the Country Club District comprises 10% of the area of Kansas City, Mo. There are now about 6,000 homes in the district. The population, including residents in 160 apartment buildings, totals 35,000. The buying needs of this little city-within-a-city are supplied by one central shopping area, the Country Club Plaza and seven neighborhood groups of stores, occupying ten full blocks.

All of the homes built by Mr. Nichols are completely piped for all uses of gas. Most of the homes that have been erected are using gas for heating and practically all of the homes built within the last five years are equipped with a straight gas design furnace. Furthermore, all the homes are equipped with automatic gas water heaters and ninety-eight per cent use gas for cooking.

Illustration is the first page of a four page folder, printed in colors, issued by American Meter Co., New York. It is a "Gas on Parade" folder to stimulate interest in the large number of uses of gas at the New York World's Fair. Gas company advertising departments who can find use for the cut work in connection with their consumer promotion plans will have the co-operation of the company.

Northern Indiana Public Service Company Elects Officers and Directors

Dean H. Mitchell, of Hammond, was re-elected president of the Northern Indiana Public Service Company recently at a meeting of the board of directors following the annual meeting of stockholders.

The other officers elected were D. L. Bement, vice-president; E. D. Anderson, vice-president; Walter A. McDonough, secretary and comptroller; Fred E. Thacker, treasurer; I. E. Fasan, assistant secretary, and E. M. Alt, assistant treasurer, all of whom were re-elected.

At the stockholders' meeting, the following were elected directors: Mr. Mitchell; Mr. Bement; Mr. Anderson; Joseph M. Farrell, of Goshen; Averill C. Colby, of Hammond, and Stuart J. Barrett and Laurence K. Callahan, of Chicago.

Pennsylvania Gas Association Will Meet at Skytop

The annual convention of the Pennsylvania Gas Association will be held at Skytop, Pa., on Tuesday, May 2, to Thursday, May 4, inclusive, and will consist of two evening and two morning sessions. L. B. Eichengreen, vice-president and chairman of the meetings of the Papers & Program Committee, has arranged a very attractive series of papers which will take up distribution, accounting, customer and employee relations, production, and new business. The sessions will be presided over by E. E. Mensch, president of the association.

The sessions will open Tuesday evening at the annual dinner at which the main speaker will be James Gheen, well known humorist and philosopher. On Wednesday evening Conrad Lauer, president of the American Gas Association and Gerald Steadman will be the speakers.

The tentative program for the two morning business sessions is as follows: Wednesday, May 3, "The Use of Pressure Control Fittings and High Pressure Distribution," by R. L. James, Harrisburg Gas Company; "The Design and Operation of Regulator Stations," by S. A. Kuntz, Philadelphia Electric Company; "Continuing Property Records," by L. C. Purcell, vice-president, Pennsylvania Power & Light Company; "Customer History Record," by William A. Hill, Delaware Power & Light Company, and "What the Customers Think of Utilities," by Elmo Roper, of Fortune Magazine. Thursday, May 4: "Flood Conditions at Providence During the Recent Hurricane," by R. L. Fletcher, Providence Gas Company; "The Gas Industries' Court of Flame"—Exhibit at the New York World's Fair, by Hugh Cuthrell, vice-president, Brooklyn Union Gas Company; "What our Competition has to Meet Tomorrow," by R. J. Rutherford, Worcester Gas Light Company, and president of the New England Gas Association; "Foundation of Tomorrow's Marketing," by Gerald Steadman, and "Tomorrow We Sell," by Walter C. Beckjord, vice-president and general manager of Columbia Gas & Electric Corporation.

Court of Flame At New York World's Fair

The official dedication of the Court of Flame erected by Gas Exhibits, Inc., at New York World's Fair took place on the evening of March 31st. There was also a preview of "Homewood," the all-gas Good Housekeeping home.

The pylons at the Court of Flame entrance, illuminated with gas, were intensified with a variety of colorful effects that were truly remarkable.

CONVENTION CALENDAR

April

10-12 *Mid-West Gas Association,* Des Moines, Ia.

12 *New Jersey Gas Assn.,* Berkeley - Carteret, Asbury Park, N. J.

12-14 *Missouri Association of Public Utilities.* Annual Convention.

17-19 *American Gas Association,* Distribution Conference—Technical Section, Palmer House, Chicago.

May

2-4 *Pennsylvania Gas Association,* Annual Meeting, Skytop Club, Skytop, Pa. Secretary, Frank W. Lesley, Penna. Gas & Electric Co., York, Pa.

8-9 *Indiana Gas Assn.* 29th Annual Convention, Ft. Wayne, Ind.

8-11 *American Gas Association.* Natural Gas Section, Tulsa, Okla.

12 *New England Gas Assn.* Operating Division, Hotel Bond, Hartford. Production and Distribution Sessions.

15-17 *American Gas Assn.* Joint Production and Chemical Committee Conferences, — Technical Section, Rochester, N. Y.

22-23 *American Gas Assn.* Hotel, Restaurant and Comm. Sales Conference, Hotel St. George, Brooklyn, N. Y. In charge; F. T. Herty, Brooklyn Union Gas Co.

24-26 *Assn. Gas Appl. & Equipt. Mfrs.* Roosevelt Hotel, New York, N. Y.

June

6-7 *Canadian Gas Association,* Annual Convention, Royal Connaught Hotel, Hamilton, Ont. Secy-Treas. G. W. Allen, 7 Astley Ave., Toronto 5, Ont.

9 *Empire State Gas & Electric Assn.* Group Meeting (Gas Operating) Tower Club, Park Central Hotel, New York.

29-30 *Michigan Gas Assn.* Annual Convention, Grand Hotel, Mackinac Island, including July 1.

September

4-9 *Pacific Coast Gas Assn.* Fairmont Hotel, San Francisco.

9 *Gas Industry Day,*—Golden Gate Exposition.

October

9 *Gas Industry Day,* — New York World's Fair.

9-12 *American Gas Assn.* Annual Convention, New York, N. Y.

Indiana Gas Association to Meet

The Indiana gas industry, serving more than 350,000 Hoosier homes, will hold its annual convention at Fort Wayne May 8 and 9. The Indiana Gas Association has announced preliminary plans for the meeting, which will attract approximately 300 representatives of the gas companies and a number of outstanding speakers.

Dean H. Mitchell, Hammond, president of Northern Indiana Public Service Company, is president of the association. Paul A. McLeod, of the Public Service Company of Indiana, is vice-president, and H. W. Thornburg, of the Central Indiana Gas Company, holds the post of secretary-treasurer.

The convention will hear reports of association officers, including the president's address, at the Monday morning session. R. S. Agee, sales promotion manager of the Association of Gas Appliance and Equipment anufacturers, will speak on "The CP Range Program."

Monday afternoon will be devoted to sectional meetings for persons engaged in technical, accounting and sales activities.

Missouri Association of Public Utilities Annual Convention

The thirty-third annual State Convention of the Missouri Association of Public Utilities will be held April 12, 13 and 14 in Kansas City, Mo., at Hotel Muehlebach. The membership of the Association includes virtually all of the privately-owned electric, gas and water companies in Missouri.

Among the speakers will be: Thomas R. Weymouth, New York City, Chairman Natural Gas Section, American Gas Association; C. W. Kellogg, New York City, President Edison Electric Institute; C. B. Huntress, New York City, Republic Coal & Coke Co.; Nathaniel Leverone, Chicago, Illinois, Automatic Canteen Co.; Frank E. Fehlman, New York City, Advertising Counsel; Ralph W. Carney, Wichita, Kan.; Ben C. Adams, Kansas City, Mo., Gas Service Co.; and Mayor Bryce B. Smith of Kansas City.

Some of the Subjects will be: "Helping Ourselves," "Gas Moves Forward," "What is Before Us," "The Recovery Problem," "The Progress of Illumination," "Federal Competition and Its Effect," "The Man Who Sells," "Advertising and its Relation to Public Utilities."

Tulsa, Oklahoma

Keep in mind May 8-11—that is the time of meeting of Natural Gas Section of A. G. A. The four-day program includes many innovations. Gas men of wide experience will address the meetings. The Mayo Hotel will be headquarters.

"Man-the-Sales" Campaign

The promptness of gas company sales managers in registering their companies as contestants for the trophies to be awarded in the "Man-the-Sales" campaign is an indication of the vigor and enthusiasm with which the contest will be carried on during the ensuing three months, according to R. J. Rutherford, chairman of the 1939 American Gas Association Refrigeration Committee.

Reports received at headquarters show that the promotional setup for the campaign is having an enthusiastic reception by the gas appliance selling divisions of the contesting utilities.

The above picture shows a reproduction of a painting of "The Flying Cloud" as she may have appeared on a calm day during one of her illustrious voyages. Holding the picture is F. E. Sellman, vice-chairman of the American Gas Association Refrigeration Committee. The painting was done by Mr. Sellman himself, painting being his hobby.

This year's trophy, a model of "The Flying Cloud," the famous Yankee clipper which broke all records for speed during the picturesque clipper ship era seems to have had an instant appeal as an incentive to management and men alike in their efforts to win success for their companies.

In this year's contest, 37 models of "The Flying Cloud" are offered to a similar number of companies that are ahead in sales of Servel Electrolux gas refrigerators at the end of the April-May-June period of the contest, this being a much larger number of trophies than was granted in previous years.

Equally pleasing to contestants is the theme of the campaign in which the sales forces of each participating company is urged to emulate the skipper and the crew of "The Flying Cloud," whose seamanship resulted in gaining fame and fortune for the clipper's owners. The campaign took its name from the cry, "man the sails" which went up when a greater spread of canvas was needed to increase speed.

As in other campaigns of recent years, the individual salesmen will receive substantial cash prizes. To the high salesmen winners of this year's contest, more than $30,000 will be divided among the "crew."

In addition to cash, individual high men who make record sales in the grand finals will each receive a Chelsea Ship's Bell Clock.

Cash awards will also be added to the trophies offered to winning companies. Trophies and cash prizes to company winners will be distributed as follows:

Division 1: Four clipper ship models and three cash awards of $500 each, and one $100 prize.

Division 2: Nine clippers and cash prizes ranging from $300 to $50.

Division 3: Eight clippers, cash awards ranging from $200 to $25, and two Chelsea Ship's Bell clocks.

Division 4: Six clippers and cash prizes ranging from $300 to $100.

Division 5: Seven clippers and cash prizes ranging from $200 to $25.

Division 6: Three clippers; cash prizes ranging from $100 to $25, and a Chelsea Ship's Bell clock.

Awards of $25 each will go to the home service departments of all companies winning first place where such companies have regularly employed home service directors or departments.

The campaign, as in other parts, will be conducted by the American Gas Association Refrigeration Committee in collaboration with Servel, Inc., and the Association of Gas Appliance and Equipment Manufacturers.

Clarence Law Elected Vice-President Consolidated Edison Co.

At the organization meeting of Consolidated Edison Company of New York, Inc., March 27th, Clarence L. Law, executive assistant to the vice-chairman of the board, was elected a vice-president of the company. Floyd L. Carlisle, chairman, Oscar H. Fogg, vice-chairman, Ralph H. Tapscott, president, and the other officers were re-elected. Charles Nodder was elected an assistant secretary.

Mr. Law has been with Consolidated Edison Company and predecessor companies since November 1, 1906, when he became a special inspector in the contract and inspection department of The New

CLARENCE L. LAW

York Edison Company. Five years later he was made manager of the bureau of illuminating engineering, and in 1923 received appointment as assistant to the general commercial manager and also assistant to the vice-president of The Yonkers Electric Light and Power Company. In 1928 he became general commercial manager of The New York Edison Company, and in 1935 executive assistant to the president. He is a director of the Westchester Lighting Company and The Yonkers Electric Light and Power Company.

INDUSTRIAL GAS BOILERS
GARMENT PRESS BOILERS
100 lbs. ASME Code
¾ to 45 H.P.

P. M. LATTNER MFG. CO.
MAIN OFFICE
CEDAR RAPIDS, IOWA

Marked Reduction in Explosion Hazards in Manholes in Boston, Mass.

An investigation of combustibles in manholes in Boston, Massachusetts, conducted by the Bureau of Mines, United States Department of the Interior, and described in a report just issued, shows a marked reduction in explosion hazards.

A general survey of the constituents present in manholes during the year in which the survey was made, showed two general types of contamination: (1) gases containing hydrogen, carbon monoxide, illuminants, and methane, usually due to manufactured gas that had found its way into manholes from leaks in gas mains and services, and (2) gases that contained abnormally high percentages of carbon dioxide, varying amounts of methane, and low percentages of oxygen, termed "soil" gases.

Because of its interest in accident prevention, the Bureau of Mines cooperates with city and state officials and utilities in investigating the causes of explosions in sewers, manholes, tunnels, and other underground chambers and conduits and carries on investigations leading to the prevention of such explosions. The Bureau has cooperated since 1929 with public utilities in Boston, Massachusetts, for the purpose of identifying and eliminating combustible hazards in manholes in that city and surrounding territory.

During the year 1937, 12,906 tests were made in manholes of the Boston Edison Co. and 3,447 in manholes of the New England Telephone & Telegraph Co., a total of 16,353 for the year. The tests were conducted along the general lines followed in similar previous surveys in Boston. The same type of detector and the same test procedure were used, and the samples taken for complete analysis were shipped to the Central Experiment Station of the Bureau of Mines at Pittsburgh, Pennsylvania.

Results obtained in manholes of both the Boston Edison Co. and the New England Telephone & Telegraph Co. during the year showed a substantial decrease in explosion hazards.

Contamination from more than one source was not uncommon, and often there was no sharp dividing line between the two classes of contamination. In previous years, gasoline and other hydrocarbons of a similar type were found in a few of the manhole atmospheres; however, during this survey none of these hydrocarbons was found.

The survey has again demonstrated the value and necessity of cooperative, systematic, and continuous manhole testing to reduce the explosion hazards in such underground openings to a minimum, and has shown that the detection, control, and elimination of combustible hazards in manholes can be obtained best by close cooperation of the interested parties.

The results of this survey are given in Report of Investigations 3433, "Investigations During 1937 of Combustibles in Manholes in Boston, Massachusetts," by G. W. Jones, John Campbell, F. M. Goodwin, and W. J. Huff, copies of which may be obtained from the Bureau of Mines, Washington, D. C.

Hardwick Stove Co., Establishes Eastern Sales Office

Benjamin Feinstein and William Scheffel, formerly connected with a western stove manufacturer, now have the exclusive factory representation in New York for the Hardwick Stove Co., Inc., Cleveland, Tennessee, manufacturers of stoves since 1879. Their address is 8801 Shore Road, Brooklyn, N. Y.

LOST

Millions of cubic feet of Illuminating Gas.

FOUND

Thousands of the Gas Leaks that caused the loss.

BY

NEW ENGLAND FORESTRY SERVICE Inc.
75 Federal Street
BOSTON MASSACHUSETTS

Write Us For Further Details

"Trees, like humans, respond to proper care." © 1935

Col. W. F. Rockwell Elected Director of Insurance Company

At the annual meeting of the American Mutual Liability Insurance Company on February 15th, Colonel W. F. Rockwell, President of the Pittsburgh Equitable Meter Company and its subsidiary, the

Col. W. F. Rockwell

Merco Nordstrom Valve Company, was elected to membership on the Board of Directors. American Mutual, with headquarters in Boston, is described as being the first American company to write general liability insurance.

Walter H. Parker Vice-President of Pittsburgh Equitable Meter Co.

Col. W. F. Rockwell, President of the Pittsburgh Equitable Meter Company, has announced the election of Mr. Walter H. Parker as Vice President of the company. Mr. Parker has been Manager of the Liquid Meter Division for a number of

W. H. PARKER

years. In his new capacity he will have charge of all manufacturing operations in the two Pittsburgh plants as well as the factory in Hopewell, New Jersey. A graduate of North Carolina State University, Mr. Parker, previous to becoming associated with the meter company in 1929, served as Chief Engineer for the Fry Equipment Company of Rochester, Penna.

INDEX TO ADVERTISERS

Alpha Lux Co., The ..... —
American Lava Corp'n ..... —
American Meter Co. 8
American Stove Co. ..... —
Auditorium Hotel ..... —
Autogas Corporation 37

Barber Gas Burner Co., The 35
Bismarck Hotel 37
Blaw-Knox Company 4
Brookmire Corporation ..... —

Carbide & Carbon Chemicals Corp. 24
Cast Iron Pipe Research Assn., The 2
Chaplin-Fulton Mfg. Co., The 33
Chelsea Hotel ..... —
Cleveland Gas Meter Co. ..... —
Cleveland Trencher Co. 33
Coal Carbonizing Co. 35
Combustion Utilities Corp'n 49
Connelly Iron Sponge & Governor Co. 33
Cooper-Bessemer Corp'n ..... —
Cruse-Kemper Co. 37

Dresser Mfg. Co. 23

Gas Purifying Materials Co. 36
General Coal Co. ..... —

Handley Brown Heater Co. ..... —
Hays Manufacturing Co. 41
Henry Furnace Co. ..... —
Howle Company ..... —

Improved Equipment — Russell Engineering Corp. 49

Kitson Company 37

Lambert Meter Co., Inc. 35
Lattner Mfg. Co., P. M. 47
Lavino & Co., E. J. 51

Merco-Nordstrom Valve Co. ..... Front Cover
Metric Metal Works 8

National Tube Co. ..... —
New England Forestry Service 48

Partlow Corp'n, The 22
Phillips, Alfred I. ..... —
Pittsburgh Coal Co. 38
Pittsburgh Equitable Meter Co. ..... Front Cover
Pittsburg Water Heater Corp'n 30

Research Corp'n ..... —
Republic Heaters Sales Co. 37
Reynolds Gas Regulator Co. 51
Robertshaw Thermostat Co. ..... —
Roper Corp., Geo. D. ..... —

Safety Gas Main Stopper Co. ..... —
Semet-Solvay Engineering Corp. 3
Servel Electrolux Div. 5
Skinner Co., M. B. 6
Sprague Meter Co., The ..... Fourth Cover
Superior Meter Company 49

Titan Valve & Mfg. Co., The 37
Therminsul Corp'n ..... —

Union Carbide & Carbon Corp. 24
United Engineers & Constructors, Inc. ..... —

Western Precipitation Co. ..... —
West Gas Improvement Co. ..... —

Combustion Utilities Corporation

IMPROVED EQUIPMENT — RUSSELL ENGINEERING

Coal Gas Plants—Horizontal Ovens, Benches, Refills, Additions, Repairs, Charging and Discharging Machines.

ENGINEERS **DIVISION** **BUILDERS**

60 Wall Street, New York

Oil Gas Plants—"Refractory Screen" Process for Base—Standby or Peak Loads—On Existing or New Water Gas Sets—Low or High B.T.U. Gas.

SUPERIOR GAS METERS

For Sound Values and Continuous Operating Economy. Meters for Domestic and Industrial Use, All Sizes 5B to 60C.

Wet Test and Demonstration Meters
Diaphragms—Service Cleaners
Provers—Meter Repairs.

Superior Meters are built to A. G. A. specifications to provide complete protection against leaks and costly repairs. Write for details and quotations.

SUPERIOR METER COMPANY

167 41st Street ***Brooklyn, N. Y.***

Obituary

AGNES GLEASON MURPHY

Agnes M. Gleason, in private life Mrs. William D. Murphy, formerly secretary of AMERICAN GAS JOURNAL, Inc., died at her home in the Bronx, New York, on Monday, March 13, 1939.

Miss Gleason started work for the JOURNAL as a bookkeeper on October 1, 1916. Four years later on October 15, 1920 she was elected secretary of the corporation, which position she held for eighteen years.

In November, 1932 she was married to Mr. William D. Murphy, an officer of the City of New York Parole Commission, but to the JOURNAL staff and to her many friends in the gas industry, she continued to be known as Miss Gleason.

AGNES GLEASON MURPHY

For many years she was a member of the American Gas Association and was particularly active on committees of the Home Service Section. She attended most of their special meetings as well as almost every annual convention of the Association.

In 1936 she had a severe illness from which she never fully recovered, and she finally found it necessary to discontinue her active connection with the JOURNAL.

Miss Gleason was an executive of ability and a fine personality. She had a wide circle of friends throughout the gas industry and they will miss her cordial greetings at the various metings she has heretofore attended.

LARMOUR ADAMS

Stricken with a heart attack Saturday, March 4, in the home of his sister, Mrs. Henry D. Jones, of Dunkirk, N. Y., Larmour "Mike" Adams, former Erie auto salesman and widely known in sports circles here, died at 8:30 P.M. the following Tuesday. He was 54 years old.

LARMOUR ADAMS

Adams, who won the first city golf championship in 1921, and again was the winner in 1923 in the competition, attended the University of Virginia, where he played on the college's baseball team.

The son of the late Mr. and Mrs. P. H. Adams, pioneer Erie-ites, Mike Adams formerly resided in Erie. His father was the organizer of the Mutual Telephone Company here.

Before he became associated in the automobile business, Adams was an employe of the Metric Metal Co. for 15 years. Later he moved to Pittsburgh where he was associated with the Pittsburgh Equitable Meter Company.

J. J. WHITEHEAD

Judson J. Whitehead, founder and president of the Whitehead Metal Products Company, Inc., now a subsidiary of International Nickel Company, Inc., died in New York on March 1, at the age of 57.

A native of New York, Mr. Whitehead entered the employ of the U. T. Hungerford Brass and Copper Company as a young man, and in 1910 was sent to Boston to take charge of the company's branch there. In 1914 he organized his own firm for the distribution of nonferrous metals, representing first the Detroit Copper and Brass Company then the Aluminum Company of America and the American Brass Company.

Later Mr. Whitehead began distributing products of the International Nickel Company, a connection which led to the unification of his firm as a subsidiary.

Building Up a Run Down Gas Plant

(Continued from page 29)

utility men show them something attractive and the sale is made. With the new C. P. gas range we have something to offer them that they ought to be proud of and that will last them for years and give them very efficient service.

A great many of us gas men also overlook many of our opportunities outside of heating and cooking and water heating that are really very attractive from an earnings standpoint. Just to mention one of these is an egg hatchery that we hooked up about a year ago. It is a six months customer that gives an income of about $50.00 a month for six months. This hatchery was running a coal bill of about the same cost of the gas. It is now on automatic control with an automatic gas burner, where before it had to have a man attend the fires at midnight. This one customer gives a revenue that is as great as quite a number of minimum bill residence users of gas.

To make a real success of your work you must like it, live it, love it, and as soon as your customers see that your whole heart is in it, that you really believe in it and that you fairly live it and that you cannot be defeated in it, they will begin to follow you and success is your reward.

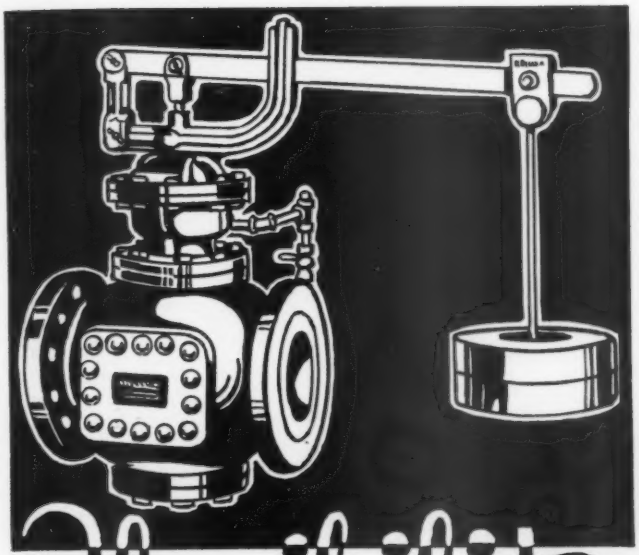
Stacey Corporation at New Address

The International Stacey Corporation who controls the Roots-Connersville Blower Corporation and the Stacey Brothers Gas Construction Company has removed its New York office from 24 State Street to the 31st or penthouse floor at 21 West Street.

Roper CP Ranges for Canadian Trade

Under the trade name of "Moffat Roper" arrangements have been completed between Geo. D. Roper Corp. and Moffats Limited of Weston, Ont. Canada, for the manufacture and sale of the full line of CP and standard ranges as now sold for American consumers by the Roper Corporation.

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.



Flexibility

. . . an important feature in successful Gas Control Performance.

REYNOLDS' High Pressure Line Regulator, shown above without auxiliary bowl, features an extremely wide range of delivery pressure control. Designed and engineered for control of outlet pressures, from 2 to 100 pounds in the line, this Reynolds unit assures absolutely accurate and dependable control. This variance in outlet pressure is made possible by the use of four different sizes of diaphragm cases.

On inlet pressure the range is up to 650 pounds. The Reynolds High Pressure Line Regulator can be furnished in cast iron, steel or bronze body, depending on pressure requirements. This Regulator is also furnished with auxiliary controls if desired. Reyonlds' High Pressure Line Regulators are built with auxiliary bowl when so ordered.

Standardization on Reynolds' Regulators assures continued accuracy, safety, years of service, and economical upkeep.

Branch Offices:
421 Dwight Bldg.,
Kansas City, Missouri
2nd Unit, Santa Fe Bldg.,
Dallas, Texas

Representatives:
Eastern Appliance Company,
Boston, Massachusetts
Wm. A. Ehlers,
East Orange, New Jersey

REYNOLDS GAS REGULATOR CO.
Anderson, Indiana, U. S. A.
GAS CONTROL SINCE 1892

Good News!

. . . this

Guarantee:

"In all cases where gas purification practices be such as are recognized generally as standard — E. J. Lavino and Company now will guarantee, in writing, a definite maximum cost per pound of sulphur removed using Lavino Activated Oxides!"

We emphasize that this is a personalized Guarantee. A maximum cost of H_2S removal *in your own plant, under your own conditions of use* will be predetermined. Then, your cost of H_2S removal, using Lavino Activated Oxides is guaranteed absolutely not to exceed the estimated figure.

If you've hesitated to risk present "fairly good" results in trying to get *better* results, this plan gives you your chance to save without *any risk at all!* With predetermined costs you can't lose!

● *Ask for your individual Guarantee; use the coupon!*

E. J. LAVINO and COMPANY
1528 Walnut Street, Philadelphia, Pennsylvania

Gentlemen:
I'm interested in your Guarantee Plan; I'd like to see what savings I can make.

NAME .....

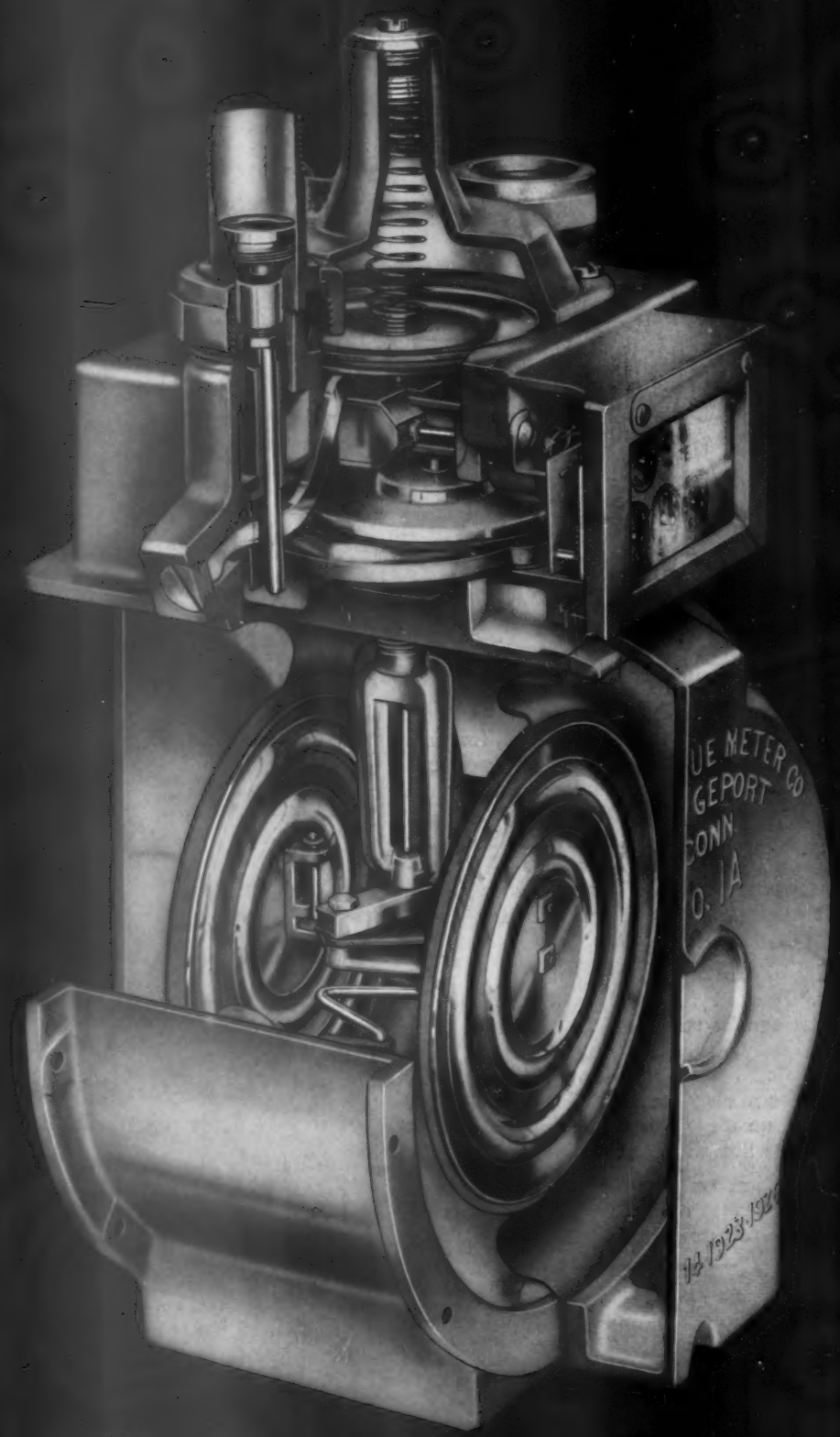
TITLE .....

COMPANY .....

ADDRESS .....

A.G.J. 4

Sprague Leads Again



Here it is!!

The latest achievement in Gas Measurement and Control . . . a combination Meter and Regulator. Write for particulars.

SPRAGUE METER CO., BRIDGEPORT, CONN.